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AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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Typical Report Citation and Abstract

❶ **19970001126** NASA Langley Research Center, Hampton, VA USA
❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
❹ Mar. 1996; 130p; In English
❺ Contract(s)/Grant(s): RTOP 505-68-70-04
❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10’ to 50’, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65’ swept forebody serrations tended to roll together, while vortices from 40’ swept serrations were more effective in generating additional lift caused by their more independent nature.
❽ Author
❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

1. Document ID Number; Corporate Source
2. Title
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AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 367)

FEBRUARY 6, 1998

01
AERONAUTICS

19980004114 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Identification and Reduction of Bottlenecks Concerning MICAP Re-Supply of F-16 Weapons System Avionics Line Replaceable Units

Muno, Karl N., Air Force Inst. of Tech., USA; Pezoulas, Patrick K., Air Force Inst. of Tech., USA; Sep. 1997; 67p; In English
Report No.(s): AD-A329825; AFIT/GTM/LAL/97S-6; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This thesis evaluates selected F-16 avionics Line Replaceable Units (LRUs) transiting the logistics pipeline in order to examine the existence of bottlenecks and explore potential solutions within the current Department of Defense (DoD) logistics reparable pipeline. A previous study reported that a reduction in the overall pipeline resupply time of at least one day equates to a savings of approximately $25.45 million (Hill et al, 1990:iii). Bottlenecks cause movement delays to the entities moving through the logistics reparable pipeline. The pipeline segments are: AO (requisition), AE (item availability), AS (shipment status), and D6 (receipt). The bottlenecks of concern are those that occur when normally allowed transit times are exceeded. The transit times are set forth by supply and transportation priorities in the Uniformed Materiel Movement and Issue Priority System (UMMIPS). This study focuses on five specific NMCS avionics Line Replaceable Units (LRU) which are also two level maintenance (2LM) parts for the F-16 weapons system. The data, retrieved from the Enhanced Transportation Automated Data System (ETADS), consists of 682 Air Force shipments from the period 1 July through 31 September 1996. The overall performance of the shipments was poor with approxima tely 83 percent failing to meet the authorized UMMIPS standard. The segment with the most bottlenecks is the AS (shipping status) segment. of the 63 shipments evaluated (accompanied with shipping documents), 49 contained bottlenecks within the AS segment.

DTIC

Logistics Management; Avionics; Defense Program

19980004210

Shock formation by compressible vortex ring impinging on a wall

Minota, T., Ariake Natl. Coll. of Technology, Japan; Nishida, M.; Lee, M. G.; Fluid Dynamics Research; September, 1997; ISSN 0169-5983; vol. Volume 21, no. no. 3, pp. 139-157; In English; Copyright; Avail: Issuing Activity

The flow field induced by a high speed vortex ring approaching a solid wall has been experimentally and numerically studied. The type of vortex ring treated here is generated by a shock produced in a shock tube and then emitted from the tube into the atmosphere. The flow field near the wall has been clarified from the experimental and numerical results. As the vortex ring approaches the wall, a wall boundary layer is induced; thereby a wall vortex is formed. Moreover, a shocklet is generated in the narrow region between the vortex ring and wall vortex. In addition to this shocklet, another shocklet is produced between the vortex core and the separation point of the boundary layer. Concerning the flow field other than near the wall, shock focusing produced by a triple point induced by shock/vortex ring interaction is discussed.

Author (EI)

Vortex Rings; Hydrodynamics; Vortices; Wall Flow; Shock Tubes; Boundary Layers

19980004250

Random walks and hydrodynamical lift from wing sections

Meyer, Runald; Physica A: Statistical and Theoretical Physics; August 01, 1997; ISSN 0378-4371; vol. Volume 242, no. no. 1-2, pp. 230-238; In English; Copyright; Avail: Issuing Activity

The author presents a numerical method for obtaining the lift coefficient of wing sections by introducing a random walk algorithm. The phenomenon of migrating fluid fronts in filter paper around macroscopic obstacles leads to a numerical model of unsteady potential flow the author calls 'random walk source model'. The shape of the migrating fluid fronts simulated in the random walk model tells the history of the path of fluid particles leading them to the front, and thus carrying the information about the lift coefficient of the passed wing section. He studied the migration of simulated fluid fronts around Joukowsky profiles whose lift coefficient is known, and compares the theoretical given lift coefficient with the numerically determined value, resulting from the random walk experiment. Even though the contour of the Joukowsky profile is approximated by only 100 to 200 pixel units, it is possible to predict the lift coefficient with an accuracy of 10%.
Author (EI)
Random Walk; Wings; Hydrodynamics; Random Processes; Algorithms

19980004921
Using neural networks as part of a system to recognize formations of aircraft
Zanelli, Paul R., Univ. of York, UK; Austin, J.; IEE Conference Publication; 1997; ISSN 0537-9989, no. no. 440, pp. 152-157; In English; Networks, Jul. 7-9, 1997, Cambridge, UK; Copyright; Avail: Issuing Activity

This paper describes a technique for recognizing formations of aircraft from data that has been gathered by a number of independent sensors, then fused together to form a single representation of the environment. The task of recognizing formations is formulated as a 3-D deformable template matching problem. The amount and type of deformation allowable by each template is learned from noisy examples of the template, using probability density estimation techniques. We compare a simple neural network approach to probability density estimation to a classical statistical approach. A more elaborate density estimation scheme is then presented that has been developed using ideas from both the classical statistical and neural network fields. Results are presented for all three techniques on simulated real world data.
Author (EI)
Neural Nets; System Identification; Probability Density Functions; Statistical Analysis; Computer Graphics

19980005016 General Accounting Office, National Security and International Affairs Div., Washington, DC USA
Aircraft Acquisition: Affordability of DOD's Investment Strategy. Report to Congressional Requesters
Sep. 1997; 39p; In English
Report No.(s): AD-A330298; GAO/NSIAD-97-88; B-272636; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The affordability of the Department of Defense's (DOD) aircraft modernization programs has been the subject of much recent debate and was the primary subject of hearings held by your Committee in June 1996 and March 1997. At those hearings, we testified that DOD'S planned investments in aircraft were not achievable within likely future budgets and appeared to be inconsistent with the existing security environment.1 The Congressional Budget Office (cBo) expressed similar concerns. However DOD continues to believe that its aircraft investment strategy will be affordable. Since the March 1997 hearing, we have updated our analysis of DOD'S aircraft investment strategy to reflect the December 1996 Selected Acquisition Reports. As you subsequently requested, we are issuing this report to assist you in your work on the fiscal year 1998 defense authorization bill and continuing review of the Quadrennial Defense Review. The Congress will be faced with a number of critical decisions on DOD'S aircraft investment strategy as the Nation proceeds in an environment of constrained budgets for the foreseeable future. The purpose of this report is to inform the Congress about the long-term implications and affordability of DOD'S aircraft strategy. to gain a broad understanding of the affordability of DOD'S aircraft investment strategy, we evaluated (1) DOD'S and cBo's estimates of the annual funding needed for aircraft programs, as a percentage of the overall DOD budget, and compared that percentage to a long-term historical average percentage of the defense budget; (2) the potential long-term availability of funding for DOD'S planned aircraft procurements; and (3) DOD'S traditional approach to resolving funding shortfalls.
DTIC
Resolution; Security; Procurement

19980005205 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA
Economic Analysis for an F-22 Organic versus Contractor Aircraft Battle Damage Repair Ownership Decision
Kitchens, John A., Air Force Inst. of Tech., USA; Sep. 1997; 137p; In English
Report No.(s): AD-A329925; AFIT/GLM/LAL/97S-5; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The purpose of this study was to evaluate whether Contractor Logistics Support (CLS) is a viable alternative to Combat Logistics Support Squadrons (CLSSs) for providing F-22 Aircraft Battle Damage Repair (ABDR). Legalities, practicalities, and cost-effectiveness were key ownership concerns. United States Code, Office of Management and Budget, Department of Defense (DoD), and USA Air Force (USAF) requirements were reviewed to address legal and policy issues and whether F-22 ABDR is

military essential. The Army's Logistics Civil Augmentation Program (LOCCAP) award fee history was used to assess the potential performance of F-22 ABDR CLS personnel. F-117 ABDR team requirements and costs were used to estimate F-22 CLSS costs. Results show DoD must decide if F-22 ABDR is a core logistics function and the USAF must determine F-22 ABDR requirements before outsourcing legality is clear. However, DoD civilian reliance continues today, and LOGCAP experiences attest that contractors consistently meet or exceed all clearly stated requirements. Analysis found that CLSS will provide higher combat readiness; although, CLS may provide slightly less combat readiness, but for potentially less cost. A dual approach, using a mixture of CLSS and CLS, could provide the most effective capability in terms of both combat readiness and cost.
DTIC
Economic Analysis; F-22 Aircraft; Aircraft Maintenance

02
AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

19980003996 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands
Contribution to the Understanding of the Kappa-omega Turbulence Model
ten Wolde, B. G., Technische Univ., Netherlands; Dec. 1996; 181p; In English; Figures in this document may not be legible in microfiche
Report No.(s): PB97-183024; MEMO-755; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

In order to understand the behavior of the k-omega equations in specific areas, an analytic and a parameter study are made. The results of this study are to be used to improve the results of the FANS algorithm. This work starts with the description of the turbulence phenomenon. In chapter 2, the characteristics of turbulence are described. Chapter 3 describes Wilcox k-omega turbulence model. In chapter 4, the influence of the free stream values on the boundary layer solutions is studied. Chapter 5 describes the linearization of the k-omega turbulence model in specific zones of the flow around an airfoil. In chapter 6, the Boussinesq assumption, on which the k-omega turbulence model is based, is shown to be inaccurate in normal strain dominating areas and zero shear strain areas. In chapter 7, the numerical scheme of the FANS algorithm is briefly discussed in order to be able to describe two alternative approaches for the source terms in the numerical scheme. Chapter 8 describes the reconstruction of the experimental results of the transonic flow around a RAE 2822 profile and the high-lift flow around a NLR 7301 profile with deflected flap. In chapter 9, conclusions of this work and recommendations for further use of the k-omega turbulence model in the FANS algorithm are given.
NTIS
Airfoils; Boundary Layers; Transonic Flow; Shear Strain; Free Flow

19980004117 Houston Univ., Inst. for Fluid Dynamics and Turbulence, TX USA
Breakdown of Trailing Vortices in Compressible Flows Past Wings and Conical Bodies ***Final Report, 1 Apr. 1995 - 31 Mar. 1997***
Hussain, Fazie, Houston Univ., USA; Sep. 22, 1997; 8p; In English
Contract(s)/Grant(s): F49620-95-I-0302
Report No.(s): AD-A329801; AFOSR-TR-97-0500; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Development of a finite volume code for spatially evolving simulations of flow past wings: We have developed a three-dimensional finite volume code for performing simulations of spatially evolving flows. The finite volume technique is preferred due to its flexibility for implementing a variety of realistic and physically relevant boundary conditions e.g. unlike spectral codes this method is not constrained to periodic boundary conditions only and therefore allows simulations of flows past wings with finite spans. The algorithm is formulated with equations written in generalized coordinates which makes this code useful for simulating a wide variety of flows including spatially evolving jets, flows past bluff bodies of different geometries. etc. Also, versatile grid-generation is useful in compressible flows for local grid refinement to resolve shocks.
DTIC
Compressible Flow; Vortices; Conical Bodies; Wings; Computational Fluid Dynamics; Computer Programs

19980004143 NASA Langley Research Center, Hampton, VA USA

Comparison of Several Numerical Methods for Simulation of Compressible Shear Layers

Kennedy, Christopher A., California Univ., USA; Carpenter, Mark H., NASA Langley Research Center, USA; Dec. 1997; 62p; In English

Contract(s)/Grant(s): RTOP-505-59-50-05

Report No.(s): NASA-TP-3484; NAS 1.60:3484; L-17382; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

An investigation is conducted on several numerical schemes for use in the computation of two-dimensional, spatially evolving, laminar variable-density compressible shear layers. Schemes with various temporal accuracies and arbitrary spatial accuracy for both inviscid and viscous terms are presented and analyzed. All integration schemes use explicit or compact finite-difference derivative operators. Three classes of schemes are considered: an extension of MacCormack's original second-order temporally accurate method, a new third-order variant of the schemes proposed by Rusanov and by Kutier, Lomax, and Warming (RKLW), and third- and fourth-order Runge-Kutta schemes. In each scheme, stability and formal accuracy are considered for the interior operators on the convection-diffusion equation U(sub t) + aU(sub x) = alpha U(sub xx). Accuracy is also verified on the nonlinear problem, U(sub t) + F(sub x) = 0. Numerical treatments of various orders of accuracy are chosen and evaluated for asymptotic stability. Formally accurate boundary conditions are derived for several sixth- and eighth-order central-difference schemes. Damping of high wave-number data is accomplished with explicit filters of arbitrary order. Several schemes are used to compute variable-density compressible shear layers, where regions of large gradients exist.

Author

Shear Layers; Compressible Flow; Finite Difference Theory; Numerical Stability; Computational Fluid Dynamics

19980004642 NERAC, Inc., Tolland, CT USA

Parachutes (Latest citations from the US Patent Bibliographic File with Exemplary Claims)

Oct. 1996; In English; Page count unavailable

Report No.(s): PB97-850648; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning design, fabrication, and testing of parachutes and decelerating devices that use aerodynamic drag. Designs for the canopy, shrouds, and hardware, and operating components, including canopy opening, actuators, staging, reefing, maneuvering, and separation and release mechanisms, are reviewed. Applications include deployment from aircraft for escape or air drop missions, aerial delivery of equipment and munitions, and recovery of drones. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Parachutes; Bibliographies; Performance Tests; Design

19980004739 Institut Franco-Allemand de Recherches, Saint-Louis, France

Application of the Prediction Code of the Helicopter Rotor Noise ROTAC to a Real-Size Helicopter: Comparison of Calculations with Measurements

Gnemmi, P., Institut Franco-Allemand de Recherches, France; 1994; 20p; In English; Portions of this document are not fully legible

Report No.(s): PB96-152947; ISL-PU-343/94; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The acoustic detection of aircraft is a crucial problem for the national defense authorities. This paper presents the application of the ROTAC code to one real-size helicopter in hover and forward flights. The acoustic signatures measured at Dreux-Senoches are compared with the thickness noise ones calculated by running the ROTAC code for the main rotor of the helicopter. The flight cases presented in this paper have been chosen on purpose as the meteorological fluctuations seemed to be relatively steady because the computation does not take into account these effects during the acoustic propagation.

NTIS

Rotary Wings; Helicopters; Noise Prediction (Aircraft)

19980005013 Defence Science and Technology Organisation, Weapons Systems Div., Canberra, Australia

Highly Accurate Measurement of Projectile Trajectories

Leathem, J., Defence Science and Technology Organisation, Australia; Apr. 1997; 48p; In English

Report No.(s): AD-A329892; DSTO-TN-0077; DODA-AR-010-182; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A method has been developed for making very accurate position and angular attitude measurements over the trajectory of gun launched, fin stabilised weapons. The method has been extensively used for free flight testing of weapon models. This report

describes the on board instrumentation, the range instrumentation and the experimental procedure used to carry out the trajectory measurements. The post trials processing of the camera records is also described and a brief account given of the analysis used to derive vehicle aerodynamics.
DTIC
Trajectories; Trajectory Measurement; Flight Tests

19980005127 California Univ., Dept. of Mechanical and Aerospace Engineering, Los Angeles, CA USA
Control of Interactions between Wake and Blades ***Final Report, 1 May 1992 - 30 Apr. 1997***
Ho, Chih-Ming, California Univ., USA; Sep. 1997; 144p; In English
Contract(s)/Grant(s): N00014-92-J-1731
Report No.(s): AD-A329882; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This investigation of rotor-stator interaction noise originated from an interest in reducing a ventilation-noise problem. This type of noise is generated aerodynamically by the flow inter action between the rotor and stator. In order to reduce this interaction noise thoroughly along the pipe, an efficient method is to remove noise sources aerodynamically in the interaction flow region by means of active flow control. This method suggests that we need to identify the active noise source region before attempting to implement the noise reduction. On this account, we shall employ measurement techniques for this identification process by correlating both the interaction-flow field (cause) and the corresponding acoustic field (effect). Therefore, the motive of the present study is to provide a general basis for locating the noise sources experimentally and to pave the road for possible application of the active rotor-stator interaction-noise control in the future.
DTIC
Noise Generators; Noise Reduction; Pipes (Tubes); Position (Location); Rotors; Sound Fields

19980005132 Defence Science and Technology Organisation, Weapons Systems Div., Canberra, Australia
An Aerodynamic Database for the Mk 82 General Purpose Low Drag Bomb
Krishnamoorthy, L. V., Defence Science and Technology Organisation, Australia; Kirk, D. R., Defence Science and Technology Organisation, Australia; Glass, R., Defence Science and Technology Organisation, Australia; Jul. 1997; 36p; In English
Report No.(s): AD-A329921; DSTO-TR-0554; DODA-AR-010-269; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The drag database of the Mk 82 General Purpose Low Drag bomb, the primary gravity weapon in the RAAF inventory, has some shortcomings in the quality and traceability of data, and in the variations due to configurational differences. Extensive testing of scaled models in a wind tunnel and an aeroballistic range facility have resulted in establishing estimates of the drag of a clean Mk 82 bomb as well as the incremental drag of add ons such as lugs and fuzes. These results, together with data obtained from full scale bomb drop trials, have been used to produce drag estimates for a full range of bomb configurations and release conditions. It is recommended that these data be incorporated into the mission computer of the weapon delivery system of the updated F111C aircraft. Furthermore it is recommended that the accuracy of these data be validated when the updated aircraft undergoes Ballistic Accuracy Verification flight trials.
DTIC
Aerodynamic Drag; Bombs (Ordnance); Data Bases

19980006287 Army Research Lab., Weapons and Materials Research Directorate, Aberdeen Proving Ground, MD USA
3-D Parachute Descent Analysis Using Coupled Computational Fluid Dynamic and Structural Codes ***Final Report***
Sahu, Jubaraj, Army Research Lab., USA; Cooper, Gene R., Army Research Lab., USA; Benney, Richard J., Natick Research, Development and Engineering Center, USA; Sep. 1997; 31p; In English
Contract(s)/Grant(s): DA Proj. 1L1-61102-AH-43
Report No.(s): AD-A330375; ARL-TR-1435; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A computational tool that models the terminal descent characteristics of a single or a cluster of parachutes is a technology that is needed by parachute designers and engineers. As part of a technology program annex (TPA), a joint effort between the U.S. Army Natick Research, Development, and Engineering Center (NRDEC) and the U.S. Army Research Laboratory (ARL) to develop this computational tool is now under way. As a first effort, attempts are being made to analyze both two-dimensional (2-D) and three-dimensional (3-D) flow fields around a parachute using a coupling procedure in which the fluid dynamics are coupled to 2-D and 3-D structural dynamic (SD) codes. This effort uses computational fluid dynamic (CFD) codes to calculate a pressure field, which is then used as an input load for the SD code. Specifically, this report presents the methods and results of the flow field plus the structural characteristics of a single axisymmetric parachute and a 3-D gore configur ation for the terminal descent velocity. Computed results have been obtained using the payload weight and unstretched constructed geometry of the canopies

as input. Significant progress has been made in determining the terminal descent flow field along with the terminal shape of the parachute. A discussion of the fluid and structural dynamics codes, coupling procedure, and the associated technical difficulties is presented. Examples of the codes' current capabilities are shown.
DTIC
Computational Fluid Dynamics; Descent; Dynamic Response; Dynamic Structural Analysis; Engineers; Flow Distribution; Fluid Dynamics; Structural Design; Three Dimensional Flow

19980006303 Technische Univ., Delft, Netherlands
Evaluation and Extension of the Mathematical Model Underlying the ISES Code
Kernkamp, G. J., Technische Univ., Netherlands; Dec. 1996; 100p; In English
Report No.(s): PB97-190037; MEMO-744; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

Intrinsic Streamtube Euler Solver (ISES) is a numerical method for solving the two dimensional flow with inviscid-viscid interaction. This report investigates the differences that are reported between two versions of ISES: version '88 and version 4.4. Substantial differences were found in the prediction of maximum lift, pitching moment, and drag divergence of the airfoil as functions of the angle of incidence and freestream Mach number respectively. The aim of the investigation is to find the causes of these differences and to analyze them. In chapter 1, the mathematical model of ISES version 4.4 is derived and described. In chapter 2, the differences between the two versions are described and evaluated in a theoretically. Chapter 3 explores these differences numerically. The results are presented and commented. Chapter 4 explains the grid-adaptation and presents the newly developed algorithm. The concluding remarks and recommendations are made in chapter 5.
NTIS
Airfoils; Boundary Layer Flow; Euler Equations of Motion; Evaluation

03
AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

19980003941 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands
Development of a Relational Database, Based on Airline Timetables, to Solve the Denominator Problem for Aviation Safety
Vos, P. R., Technische Univ., Netherlands; Dec. 1996; 185p; In English
Report No.(s): PB97-208334; MEMO-793; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This report summarizes the results of a feasibility study involving the development of a relational database that contains information on accident rates and which can be helpful in determining the causal factors of aircraft accidents. to assess the significance of the particular fraction found in the accident sample, it is necessary to also determine the corresponding fraction for all recorded (non-accident) flight movements. The study has focused on the denominator (non-accident) part in these ratio's. Based on a commercially available software package, a prototype denominator database has been constructed which does not rely on information regarding actual flight movements, but rather on information based on published airline timetables. By comparing the flights from the various sources, it turned out that only 3% of the flights listed in the OAG did not actually take place.
NTIS
Data Bases; Aircraft Safety; Airline Operations; Flight Safety

19980003977 Federal Aviation Administration, Washington, DC USA
Airline Operational Control Overview: FMS-ATM Next Generation (FANG) Team
Beatty, R., Federal Aviation Administration, USA; Murthy, A., Federal Aviation Administration, USA; Jul. 1997; 98p; In English
Report No.(s): PB97-199863; DOT/FAA/AND-97/8; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The report describes the current functions of flight operations management at typical USA' airlines. It emphasizes the role of dispatchers and their interactions with air traffic management (ATM) and the aircraft. These functions and interactions, collectively referred to as airline operations control (AOC), are described for different-sized airlines. The goals of this report are: (1) to provide greater understanding, in the aviation industry, in the Federal Aviation Administration (FAA) and in other government agencies, of the functioning, needs and requirements of AOCs; and (2) to emphasize AOC needs in the evolution of ATM automation and the design of aircraft Flight Management Systems (FMSs) intended to interact with the AOC and ATM. This information

provides part of the baseline for the Flight Management System (FMS) - ATM Next Generation (FANG) project to identify the functional capabilities required to implement an integrated FMS-ATM-AOC system.
NTIS
Air Traffic Control; Air Traffic; Flight Operations

19980004054 National Transportation Safety Board, Washington, DC USA
National Transportation Safety Board Transportation Initial Decisions and Board Opinions and Orders Adopted and Issued during the Month of October 1996
Oct. 1996; 167p; In English
Report No.(s): PB96-916710; NTSB/IDBOO-96/10; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche
This publication contains all Judge Initial Decisions and Board Opinions and Orders in Safety Enforcement and Seaman Enforcement Cases for October 1996.
NTIS
Air Transportation; Safety Factors

19980004558 NERAC, Inc., Tolland, CT USA
Accident Investigations: Aircraft. (Latest Citations from the NTIS Bibliographic Database)
Jan. 1997; In English; Page count unavailable. Supersedes PB96-859046
Report No.(s): PB97-854517; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche
The bibliography contains citations concerning the results of aircraft accident investigations. Topics include accident reports, aviation accidents, helicopters, and civil aviation. (Contains 50-250 citations and includes a subject term index and title list.)
NTIS
Bibliographies; Aircraft Accident Investigation

19980004834 Swedish Transport and Communications Research Board, Stockholm, Sweden
Airport Problem: An Economic Analysis of Scarce Runway Capacity
Bruzelius, N., Swedish Transport and Communications Research Board, Sweden; 1997; 109p; In English
Report No.(s): PB97-169924; KFB-1997:6; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche
This report is about airport efficiency, with an emphasis placed on larger airports. At large airport, when traffic becomes dense, the runway will become congested during periods of the day in that the use of it by one additional aircraft for either a landing or a take-off will result in a delay to other aircraft, and the passengers onboard these aircraft. The runway will as a consequence cease being a perfect public good, and the operations of one airline, or a general aviation aircraft, will start giving rise to external effects on the operations of other airlines and general aviation.
NTIS
Economic Analysis; Airports; Runways; Civil Aviation

19980005008 National Materials Advisory Board, Washington, DC USA
Committee on Commercial Aviation Security *Interim Report, Oct. 1994 - Nov. 1995*
Apr. 1996; 71p; In English
Report No.(s): PB97-207955; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche
The Federal Aviation Administration (FAA) has requested that a National Research Council committee assess the FAA's Explosive Detection Program. This report summarizes the committee's work and findings after the first year of the three year review and includes interim recommendations to the FAA.
NTIS
Security; Civil Aviation; Explosives Detection; Airports

19980005147 Nebraska Univ., Aviation Inst., Omaha, NE USA
The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society, Volume 1
Oum, Tae Hoon, Editor, British Columbia Univ., Canada; Bowen, Brent D., Editor, Nebraska Univ., USA; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; 147p; In English; 1997 Air Transport Research Group Conference, 25-27 Jun. 1997, Vancouver, British Columbia, Canada; Sponsored by British Columbia Univ., Canada; Also announced as 19980005148 through 19980005154

Report No.(s): NASA/CR-97-206487; UNOAI-97-4; NAS 1.26:206487; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Topics reported on in the proceedings include: Industrial reform and air transport development in China; the economic effects of airline deregulation and the Open-Sky policy of Korea; Open Skies in India; Japanese domestic air fares under the regulatory regime; the competitive position of airline networks; air transport and regional economic development in the European Union; and corporate dilemmas and strategies of European Airlines.

CASI

Air Transportation; Airline Operations; Civil Aviation; Conferences; Economic Analysis; Competition; Regulations

19980005148 Hong Kong Univ., Dept. of Economics and Finance, Hong Kong

Industrial Reform and Air Transport Development in China

Zhang, Anming, Hong Kong Univ., Hong Kong; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 1, no. No. 3; 19p; In English; Also announced as 19980005147; Sponsored in part by the Research Grants Council of Hong Kong; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

This article describes the regulatory and enterprise reform in the Chinese airline industry and its impact on the industry's development. China's transport sector is one of the largest sectors of the Chinese economy while aviation has been the fastest growing mode. Chinese civil air transport has grown by an average of 20 percent a year since 1980 - 4.3 times the world average. The article starts with a description of China's general economic and industrial reform, followed by a description of reforms in the air transport sector. It then examines the impact of the reform on the growth and development of China's airline industry. In particular, the following aspects of the industry are discussed: air traffic growth and route development, market structure, and airline operation and competition.

Author

Air Traffic; Air Transportation; Airline Operations; Civil Aviation; Competition; Market Research

19980005149 Hankuk Aviation Univ., Kyunggido, Korea, Republic of

The Economic Effects of Airline Deregulation and the Open-Sky Policy of Korea

Lee, Yeong-Heok, Hankuk Aviation Univ., Korea, Republic of; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 1, no. No. 3; 13p; In English; Also announced as 19980005147; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

The conference paper reports on topics that include: Brief history of air transport in Korea; performance in the Korean deregulation era; multilateral liberalization and the Open Sky policy of Korea; regulation of foreign investments in the air transport industry of Korea; and lessons learned from the early experience of deregulation and the Open Sky policy.

CASI

Air Transportation; Airline Operations; Economic Impact

19980005150 Sydney Univ., Inst. of Transport Studies, Australia

"Open Skies" in India: Is the Policy Succeeding?

Hooper, Paul, Sydney Univ., Australia; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 1, no. No. 3; 21p; In English; Also announced as 19980005147; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

With a "middle class" of 200 million people in a large country where travel between the major population centres by surface transport can be arduous, India has a potentially large domestic airline market. In the post-World War II period, India nationalised its airline industry into one international carrier, Air India, and one domestic carrier, Indian Airlines, but it began to relax these controls in 1986. Since then, a series of policy initiatives introduced what is proclaimed to be an "open skies" policy. There has been no shortage of new entrants willing to add capacity into a system where supply-side constraints are regarded as the main impediments to a boom in airline travel. However, many of these new ventures have failed within a few years and the remaining carriers, including Indian Airlines, have had to increase fares in an attempt to improve their financial performance. Far from being an "open skies" environment, airline managers continue to be subject to formal and informal government regulations and government has introduced new taxes and increased charges for aviation services. The result is an industry characterised by financial instability and low traffic growth. This paper documents the changes in the regulatory system and analyses the strategies adopted by the airlines. It is concluded that inappropriate policies are constraining development of the industry, particularly the requirement imposed by the government for the airlines to allocate their capacity on a mix of profitable and unprofitable routes.

Author

Airline Operations; Civil Aviation; Policies; Regulations

19980005151 Kobe Univ., Japan

The Japanese Domestic Air Fares under the Regulatory Regime: What will be expected after the revision of the current charging system?

Murakami, Hideki, Kobe Univ., Japan; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 1, no. No. 3; 17p; In English; Also announced as 19980005147; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

This paper statistically investigates the charging system of Japanese domestic air fares and predicts the effect of the revision of the current system on the consumer's surplus. Using 222 cross section data of 1995, this paper revealed that (a) the fares in the long haul markets were set higher regardless of the number of passengers, (b) in the outstandingly dense markets, the fares were set higher than the predicted full cost level, (c) however, in the thin and shorter haul markets, fares were a little lower. Considering the price elasticity of these three types of routes, this paper concluded that the reduction of air fares in the long haul markets (especially dense markets) to the "distance-proportional level" would lead to the substantial gain of consumer's surplus, and this would surpass the loss of consumer's surplus that might arise in shorter haul routes. There still remains substantial room for the Japanese government to improve the consumers benefit without worsening, or maybe with improving, the status quo of the airlines.
Author

Airline Operations; Civil Aviation; Market Research; Operating Costs; Cost Analysis; Regulations

19980005152 Department of Civil Aviation, An Hoofddorp, Netherlands

The Competitive Position of Airline Networks

Veldhuis, Jan, Department of Civil Aviation, Netherlands; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 1, no. No. 3; 15p; In English; Also announced as 19980005147; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

The contents of this paper is as follows. Firstly quality and frequency of direct as well as indirect connections are operationalized by variables indicating the 'connectivity' between markets. Secondly this concept is illustrated by illustrated by the so-called 'connectivity matrix', which is a simple statistical representation of the performance of any airport in the markets served from and via these airports. Before introducing this concept we have defined a study area, as well as a classification of five airport classes. The study area is Western Europe, consisting of Benelux, UK, Ireland, France, Germany, Denmark, Switzerland and Austria. The five airports classes are: (1) The 'mainports' in Western Europe: London Heathrow, Paris CDG, Frankfurt and Amsterdam. (2) The 'secondary' airports in Western Europe: Brussels, Luxemburg, London Gatwick, Manchester, Dublin, Paris Orly, Lyon, Berlin Tegel, Munich, Copenhagen, Zurich and Vienna. (3) Regional airports: all other airports in Western Europe. (4) All other airports in Europe, outside Western Europe. (5) All airports outside Europe.
Author

Airline Operations; Airports; Market Research; Air Transportation; Competition

19980005153 New Univ. of Ulster, School of Environmental Studies, Coleraine, UK

Air Transport and Regional Economic Development in the European Union

Graham, Brian, New Univ. of Ulster, UK; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 1, no. No. 3; 20p; In English; Also announced as 19980005147; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

The general objective of this paper, which concentrates on scheduled passenger air services, is to discuss the European Union's (EU) aviation liberalisation policy within the specific context of the variable economic performances and potentials of regions. Almost all previous discussions of the actual and potential repercussions of this policy have been dominated by the interrelated issues of competition and privatisation (Graham 1995). It is argued here, however, that the patterns of demand within the EU's air transport network are shaped by economic and social forces external to the mode, which impact differentially upon - and often constrain - the effectiveness of aviation liberalisation measures. Although the precise causal relationship between infrastructural provision and economic development is less than clear, the EU and individual Member State governments have invested heavily in transport and other infrastructure as a stimulus to economic growth and to help attract inward investment to less advantaged regions.
Author

Air Transportation; Economic Development; Market Research

19980005154 Pittsburgh Univ., Graduate School of Public and International Affairs, Pittsburgh, PA USA

Surviving the Single Market: Corporate Dilemmas and Strategies of European Airlines

Staniland, Martin, Pittsburgh Univ., USA; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of

the WCTR Society; Sep. 1997; vol. Volume 1, no. No. 3; 35p; In English; Also announced as 19980005147; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

In April 1997, the liberalization of air transport within the European Union enters its final phase, in which carriers will be free to operate between all airports within the Union, and particularly on routes within Member-States. This change is potentially as radical in its implications as airline deregulation was in the US, although it mainly entails the opening of new markets to all airlines, rather than the removal of general regulatory controls on routes and pricing as was the case in the US. This paper examines, using the air transport case, the complicated interaction between deregulation (in fact, variable and asymmetrical deregulation across several markets), economic integration (represented by the establishment of the Single Market), and corporate strategy (expressed in the responses of European carriers to the challenges facing many service industries).
Derived from text

Air Transportation; Airline Operations; Civil Aviation; Market Research; Economic Impact; Economic Analysis

19980005155 Nebraska Univ., Aviation Inst., Omaha, NE USA

The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society, Volume 2

Bowen, Brent D., Editor, Nebraska Univ., USA; Oum,Tae Hoon, Editor, British Columbia Univ., Canada; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR SocietyVol.2-2; Sep. 1997; 130p; In English; 1997 Air Transport Research Group (ATRG) Conference, 25-27 Jun. 1997, Vancouver, British Columbia, Canada; Sponsored by British Columbia Univ., Canada; Also announced as 19980005156 through 19980005160

Report No.(s): NASA/CR-97-206677; UNOAI-97-6; NAS 1.26:206677; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The topics discussed in the proceedings include: Airport pricing systems; Airport services and airport charging systems in the European Union; Multiple hub network choice in the European market; Marginal profitability in hub-and-spoke networks; Airline hubbing and hub region benefits; and new methods of airport finance in Japan.
CASI

Air Transportation; Airline Operations; Airports; Conferences; Cost Analysis; Market Research

19980005158 East Carolina Univ., Greenville, NC USA

How Big is Too Big for Hubs? Marginal Profitability in Hub-and-Spoke Networks

Ross, Leola B., East Carolina Univ., USA; Schmidt, Stephen J., Union Coll., USA; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 2, no. No. 2; 19p; In English; Also announced as 19980005155; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

Increasing the scale of hub operations at major airports has led to concerns about congestion at excessively large hubs. In this paper, we estimate the marginal cost of adding spokes to an existing hub network. We observe entry/non-entry decisions on potential spokes from existing hubs, and estimate both a variable profit function for providing service in markets using that spoke as well as the fixed costs of providing service to the spoke. We let the fixed costs depend upon the scale of operations at the hub, and find the hub size at which spoke service costs are minimized.
Author

Airports; Hubs; Market Research; Spokes; Airline Operations; Networks; Mathematical Models; Cost Analysis

19980005159 California Univ., Dept. of Civil and Environmental Engineering, Berkeley, CA USA

Does Airline Hubbing Benefit Hub Regions?

Hansen, Mark, California Univ., USA; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 2, no. No. 2; 30p; In English; Also announced as 19980005155; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

The purpose of this paper is to estimate the impact of airline hubbing activity on local air traffic and, by extension, local consumer benefits, in the USA. The crux of our inquiry involves the following ”thought experiment”: consider some airport (or system of airports serving the same region) that has a large amount of connecting activity-i.e. a ’hub’--and imagine an alternative scenario in which the level of connecting activity is not so large. How would locally originating air traffic and the consumer benefits accruing therefrom be different under the latter scenario? This is an important question, for several reasons. First, since airports are largely under local control planning and management decisions tend to emphasize local considerations. When an airport is a hub, a large proportion of its traffic is non-local. Airport operators have generally encouraged hubbing activity at their facilities on the grounds that it leads to increased service that benefits the local area (Moore, 1988), while opponents have emphasized the financial and environmental costs of accommodating non-local traffic. This paper informs that debate by assessing the former claim. This analysis is also relevant to questions concerning the finance and pricing of airport services. Insofar as hubbing generates local

consumer benefits, there is justification for pricing structures that encourage it, even if these are suboptimal in other respects. For example, peak-load pricing has been advocated for airports. Such pricing would penalize airlines operating connecting banks, perhaps inducing them to move their hubs elsewhere. It is important to know how such a response would affect local consumer welfare. Likewise, in the context of privatization it is important to recognize that the benefits discussed in this paper are external ones--realized by the community at large rather than the airport operator. Insofar as they exist, special inducements may be necessary if private operators are to take them into account. We restrict our scope to the benefits realized by consumers from changes in the supply of air passenger transport services to and from the hub region. We do not consider ”benefits” in the form of increased employment or money circulating through the local economy. While sometimes termed benefits, these effects ought to be considered impacts, since they do not necessarily increase aggregate welfare. The benefits we consider are, however, associated with economic impacts since many air trips are related to other economic activities. Our approach is simple. We estimate the relationship between the level of connecting activity (number of connecting passengers) in a regional airport system and the quantity of passenger traffic originating in the region. If, ceteris paribus, more connecting traffic results in more local traffic, this suggests that hubbing activity reduces the ”generalized cost” of air travel for the local region. to quantify the associated benefit, we use fare elasticity results from other studies to estimate the fare change that would yield the same increase in local demand. Given the equivalent fare change and fare elasticity, we can estimate the change in consumer surplus deriving from increased hubbing. We consider originations in the aggregate, without regard to whether the trips are being made by residents of the region or visitors to it. Consequently, our benefits are local in the sense that they accrue to individuals and firms who spend time in the local area, whether or not they actually live there. Local officials may be more directly interested in the welfare of residents than that of visitors. On the other hand, the trips by the latter generate revenues for local businesses, and for that reason are highly valued in most areas. It therefore seems reasonable to lump resident and non-resident trips together for purposes of this analysis. The remainder of this paper is organized as follows. In Section 2, we review previous work in this area and propose a conceptual approach for measuring the local benefits from hubbing activity. Section 3 presents our methodology and data. Sections 4 and 5 contain the results of our empirical analyses, which are used in Section 6 to estimate regional benefits from hubbing activity. Conclusions are offered in Section 7.
Author
Air Traffic; Air Transportation; Airline Operations; Airports; Civil Aviation; Economic Impact; Hubs; Operating Costs; Cost Analysis

19980005160 Tokyo Denki Univ., Faculty of Science and Engineering, Japan
Airport Improvement Policy in Japan: New Methods of Airport Finance
Ohta, Kazuhiro, Tokyo Denki Univ., Japan; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 2, no. No. 2; 27p; In English; Also announced as 19980005155; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

Capacity shortage of international airports in Japan is the most critical impediment to liberalization and free competition of international aviation. In this paper, we deal with the causes of the capacity shortage, Japanese institutional systems of airport improvement, and new financial methods for international airport capacity expansion in metropolitan areas. We emphasize the effectiveness of the joint-stock corporation system as a useful financial device. The introduction of the joint-stock corporation is one kind of airport privatization, but its characteristics completely differ from that of privatized airports in European countries and the USA.
Author
Policies; Airports; Improvement; Airline Operations; Financial Management; Airport Planning

19980005238 National Transportation Safety Board, Washington, DC USA
National Transportation Safety Board Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of May 1997
May 1997; 455p; In English
Report No.(s): PB97-916705; NTSB/IDBOO-97/05; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This publication contains all Judge Initial Decisions and Board Opinions and Orders in Safety and Seaman Enforcement Cases for May 1997.
NTIS
Air Transportation; Accident Prevention

19980005246 Air Force Inst. of Tech., Air University, Wright-Patterson AFB, OH USA

An Analysis of Tactical Military Airlift

Donoho, James H., Air Force Inst. of Tech., USA; Sep. 1997; 78p; In English

Report No.(s): AD-A329935; AFIT/GLM/LAC/97S-2; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This study examines tactical military airlift operations conducted during three historical battles - Stalingrad, Dienbienphu, and Khe Sanh. Aspects of tactical military airlift operations are identified from these scenarios. The list of important issues that results can be considered when employing tactical military airlift in the future. Using inductive reasoning, tactical military airlift operations in each scenario, and their success or failure, are examined to develop a pattern for recognizing and describing similar situations in the future. Experiences at Stalingrad, Dienbienphu, and Kile Sanh indicated that there are nine elements that should be considered when employing tactical military airlift. Those elements are command and control, aircraft availability and capabilities, technology, location and weather, logistical requirements, support and defense intelligence gathering, training, and political considerations. Command and control, aircraft availability and capabilities, support and defense, and intelligence gathering are identified as crucial elements for success in tactical military airlift operations. The remaining five elements may have an impact on the crucial elements. Historical experience at Stalingrad, Dienbienphu, and Kile Sanh indicate that successful application of simple concepts is not automatically achieved. Recognition of the crucial elements and their secondary elements is important to the future of tactical military airlift operations.

DTIC

Warfare; Histories; Military Operations; Air Transportation

19980005281 Federal Aviation Administration, Technical Center, Atlantic City, NJ USA

Test and Evaluation Plan for Airport Demonstration of Threat Image Projection for Checkpoint Operations ***Final Report***

Neiderman, Eric C., Federal Aviation Administration, USA; Aug. 1996; 86p; In English

Report No.(s): PB97-169239; DOT/FAA/AR-96/92; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This document is the Test and Evaluation Plan (TPE) to evaluate the effectiveness of a Threat Image Projection (TIP) system to enhance screener performance to detect threat objects at the checkpoint. The test and evaluation (T&E) will determine the effectiveness of the TIP to meet the requirements set in the Critical Operational Issues and Criteria (COICs) and Additional Evaluation Issues and Criteria (AEICs). The testing will be conducted at 19 major airports and the results will be analyzed and published in a test report.

NTIS

Airports; Airport Security; Ion Mobility Spectroscopy

19980005328 Federal Aviation Administration, Cambridge, MA USA

Enplanement and All Cargo Activity, Calendar Year 1995

Jan. 1997; 214p; In English; See also report for 1994, PB96-157185.

Report No.(s): PB97-133771; DOT/FAA/PP-97-2; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This publication contains enplanement and cargo data extracted from the Air Carrier Activity Information System (ACAIS). ACAIS is a database that contains revenue passenger enplanement and all-cargo data. The database supports the Federal Aviation Administration's (FAA) Airport Improvement Program (AIP) entitlement activities.

NTIS

Air Cargo; Documents; Information Systems

19980006074 National Transportation Safety Board, Washington, DC USA

National Transportation Safety Board Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of January 1996

Jan. 1996; 308p; In English

Report No.(s): PB96-916701; NTSB/IDBOO-96/01; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This publication contains all Judge Initial Decisions and Board Opinions and Orders in Safety Enforcement and Seaman Enforcement Cases for January 1996.

NTIS

Safety Management; Accident Prevention; Documents

04
AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

19980003961 NERAC, Inc., Tolland, CT USA
NAVSTAR Global Positioning System. (Latest citations from the INSPEC Database)
Nov. 1996; In English; Page count unavailable. Supersedes PB96-858063.
Report No.(s): PB97-851901; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the global system of navigation satellites developed to provide immediate and accurate worldwide three-dimensional positioning by air, land, and sea vehicles equipped with appropriate receiving equipment. The citations examine developments, accuracy, and applications of the NAVSTAR system, including uses for marine navigation, truck fleet management, aircraft navigation, weapon delivery systems, and automobile navigation.
NTIS
Bibliographies; Navigation Satellites; Product Development; Three Dimensional Models; Accuracy; Global Positioning System

19980004146 Massachusetts Inst. of Tech., Cambridge, MA USA
A Critical Survey of Optimization Models for Tactical and Strategic Aspects of Air Traffic Flow Management ***Final Report***
Bertsimas, Dimitris, Massachusetts Inst. of Tech., USA; Odoni, Amedeo, Massachusetts Inst. of Tech., USA; 1997; 36p; In English
Contract(s)/Grant(s): NAG2-1088
Report No.(s): NASA/CR-97-206409; NAS 1.26:206409; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This document presents a critical review of the principal existing optimization models that have been applied to Air Traffic Flow Management (TFM). Emphasis will be placed on two problems, the Generalized Tactical Flow Management Problem (GTFMP) and the Ground Holding Problem (GHP), as well as on some of their variations. to perform this task, we have carried out an extensive literature review that has covered more than 40 references, most of them very recent. Based on the review of this emerging field our objectives were to: (i) identify the best available models; (ii) describe typical contexts for applications of the models; (iii) provide illustrative model formulations; and (iv) identify the methodologies that can be used to solve the models. We shall begin our presentation below by providing a brief context for the models that we are reviewing. In Section 3 we shall offer a taxonomy and identify four classes of models for review. In Sections 4, 5, and 6 we shall then review, respectively, models for the Single-Airport Ground Holding Problem, the Generalized Tactical FM P and the Multi-Airport Ground Holding Problem (for the definition of these problems see Section 3 below). In each section, we identify the best available models and discuss briefly their computational performance and applications, if any, to date. Section 7 summarizes our conclusions about the state of the art.
Derived from text
Air Traffic Control; Flow Distribution; Surveys

19980004502 Eurocontrol Experimental Centre, Bretigny, France
Radical Revision of En-Route Air Traffic Control
David, H., Eurocontrol Experimental Centre, France; Mar. 1997; 47p; In English
Report No.(s): PB97-159388; EEC-307; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A study of the En-route Air Traffic Controllers' Interface with the ATC system led to wider consideration of the display and handling of ATC information for en-route air traffic. Initial consideration of the 'surface ergonomics' led to an in-depth consideration of the proper allocation of tasks between the controller and the system, and of the optimal distribution of information flow, employing current available technology. This leads to a proposal for a radical revision of En-route Air Traffic Control, the consequences of which are briefly considered.
NTIS
Data Links; Automated En Route ATC; Air Traffic; Human-Computer Interface

19980004627 Massachusetts Inst. of Tech., Dept. of Earth, Atmospheric, and Planetary Sciences, Cambridge, MA USA
Application of Global Positioning Measurements to Continental Collision in the Pamir-Tien Shan Region, Central Asia and GPS Survey of the Western Tien Shan ***Annual Report***
Hamburger, Michael W., Massachusetts Inst. of Tech., USA; Reilinger, Robert E., Massachusetts Inst. of Tech., USA; Hager, Bradford H., Massachusetts Inst. of Tech., USA; Molnar, Peter, Massachusetts Inst. of Tech., USA; Dec. 04, 1997; 13p; In English; Original contains color illustrations

Contract(s)/Grant(s): NAG5-1941; NAG5-1947
Report No.(s): NASA/CR-97-112968; NAS 1.26:112968; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this report, we summarize what we have accomplished with five years of funding from NASA under its DOSE program, and with a comparable level of funding from NSF. We describe the development of a GPS network in the Tien Shan of Kyrgyzstan and Kazakhstan of the former Soviet Union, the analysis of data, and the main results. This discussion presents the state of the current network, which has grown significantly since the termination of our DOSE grants, with continued support both from NSF through its continental dynamics program and from NASA's SENH program. Although grants from NASA's DOSE program did not support this growth not directly, it did so indirectly by building the infrastructure that has enabled further expansion in an area where otherwise there would be only a small GPS presence. We note how the network has grown over time, but the emphasis of this discussion is on the quantity and quality of measurements that we have made.
Derived from text
Continental Drift; Surveys; Asia; Global Positioning System; Kazakhstan; Kyrgyzstan

19980005254 NERAC, Inc., Tolland, CT USA
NAVSTAR Global Positioning System. (Latest citations from the Aerospace Database)
Dec. 1996; In English; Page count unavailable. Supersedes PB96-852355.
Report No.(s): PB97-852719; NASA/TM-96-112943; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the global system of navigation satellites developed to provide immediate and accurate worldwide three-dimensional positioning by air, land, and sea vehicles equipped with appropriate receiving equipment. Technological forecasting, reliability, performance tests, and evaluations are discussed. Developments and applications of the NAVSTAR system are included. (Contains 50-250 citations and includes a subject term index and title list.)
NTIS
Bibliographies; Global Positioning System; Navigation Satellites

19980005355 Aberdeen Proving Ground, MD USA
Land Navigation and Positioning Systems ***Final Report***
Jul. 31, 1997; 89p; In English
Report No.(s): AD-A329966; ATC-TOP-3-2-046; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This Test Operation Procedure (TOP) describes procedures for conducting technical performance tests of land navigation and positioning systems. It is modeled around the Modular Azimuth Positioning System Hybrid (MAPS Hybrid) but is applicable to all land-based navigation systems including those using the Global Position System (GPS). This TOP incorporates procedures that require automated data collection instrumentation and a reference system that will provide medium-to-high position/attitude accuracy.
DTIC
Global Positioning System; Landing Aids; Performance Tests

05
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

19980004658 National Aerospace Lab., Tokyo, Japan
Simulation Study for a Fire Helicopter, Part 2, Effects of Turbulent Wind on the Efficiency and Safety
Okuno, Y., National Aerospace Lab., Japan; Funabiki, K., National Aerospace Lab., Japan; Harada, M., National Aerospace Lab., Japan; Jun. 1996; 21p; In Japanese; Portions of this document are not fully legible; See also N96-232467 and PB96-153960.
Report No.(s): PB97-127351; NAL/TR-1293; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Simulation tests of a fire helicopter are performed using a flight simulator. A fire helicopter is being developed which has the capability to suppress a fire in high-rise buildings by discharging pressurized water while hovering near the fire. One of the problems in realizing this concept is the heavily turbulent wind around buildings that may cause difficulties in maintaining a stable hover. Wind tunnel tests and theoretical calculations are performed to clarify the characteristics of the turbulence. Based on these

results, some wind models around a high-rise building are developed which are available in real time flight simulations. Extensive piloted simulations are carried out using these models. Safety criteria are also proposed for when the helicopter approaches a building.
NTIS
Flight Simulation; Fire Fighting; Helicopters

19980004665 Eidetics International, Inc., Torrance, CA USA
Reduction of Aircraft Cruise Drag by Using Boundary Layer Heating to Minimize Fuselage Skin Friction ***Quarterly Report, 1 Apr. - 31 Oct. 1997***
Kramer, Brian R., Eidetics International, Inc., USA; Nov. 28, 1997; 87p; In English
Contract(s)/Grant(s): NAS4-50089
Report No.(s): NASA/CR-97-206450; NAS 1.26:206450; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche
The data reduction and results of the F-15B Flight Test Fixture experiment conducted at NASA Dryden are discussed. In addition, the feasibility of using the Orbital Sciences L-1011 was studied and a cost estimate prepared. Initial discussions have begun with Edwards Flight Research to explore the possibility of using their T-39 aircraft for the second flight experiment.
Author
Aerodynamic Drag; Data Reduction; Flight Tests

19980004808 Federal Aviation Administration, Regulatory Support Div., Oklahoma City, OK USA
Amateur Built Aircraft Course Guide. OSHKOSH 97
1997; 22p; In English; See also Reference Material, PB97-194179.
Report No.(s): PB97-194187; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
Topic considered include: experimental certificates; experimental operating limitations; correction the applications; certification procedures; cockpit passenger warning; and weight and balance.
NTIS
Certification; Aerospace Vehicles

19980005058
Adhesive bonding flies high
Allanson, Robert; Welding and Metal Fabrication; July, 1997; ISSN 0043-2245; vol. Volume 65, no. no. 7, pp. 8-10; In English; Copyright; Avail: Issuing Activity
Structural adhesives are sometimes the only method of joining aircraft structures and certainly the preferred method for many others. The technique is limited by design constraints, high temperature operations, and materials that are difficult to bond. The continued in-service success of bonded structures in the aerospace industry will lead to growing confidence by the designers and end users. This will bring about increased opportunities for adhesives in the aerospace and other high technology-oriented industries.
EI
Adhesive Bonding; Bonding; Adhesives; Aerospace Engineering; Joints (Junctions)

19980005353 Defence Science and Technology Organisation, Canberra, Australia
Structural Shape Optimisation by Iterative Finite Element Solution ***Topical Report***
Kaye, R., Defence Science and Technology Organisation, Australia; Heller, M., Defence Science and Technology Organisation, Australia; Jun. 1997; 60p; In English
Report No.(s): AD-A329922; DSTO-RR-0105; DODA-AR-010-247; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche
This report presents the development and automated numerical implementation of an iterative gradientless optimisation method for the analysis of problems relating to life extension of aircraft components. The method has been implemented to interface with the finite element code PAFEC, which does not normally have an optimisation capability. The key feature of the approach is to achieve constant boundary stresses, in regions of interest, by moving nodes on the stress concentrator boundary by an amount dependent on the sign and magnitude of the local hoop stress obtained from a previous iteration of a standard finite element analysis. The results of example problems are presented which include the optimisation of hole shapes in flat plates and the optimisation of the design of bonded reinforcements with a focus on minimising adhesive stress while maintaining the effectiveness of the reinforcement. In all cases significant stress reductions were achieved by way of the local shape changes. The method presented is

considered a simple robust complementary method to the use of commercially available gradient based finite element optimisation software. It is also considered suitable for use with typical standard commercial finite element packages other than PAFEC.
DTIC
Stress Concentration; Finite Element Method; Life (Durability); Computer Programming

19980005394 Defence Science and Technology Organisation, Canberra, Australia
The Use of Bonded Rubber Pads for the Application of Loads for Structural Testing of the P-3 Orion Leading Edge
Luke, G., Defence Science and Technology Organisation, Australia; van Blaricum, T.J., Defence Science and Technology Organisation, Australia; Jan. 1997; 28p; In English
Report No.(s): AD-A329920; DSTO-TR-0433; DODA-AR-009-912; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Aerodynamic loads on aircraft lifting surfaces are often due to negative pressures acting on the outer skin of the structure. to simulate this type of loading, rubber pads bonded to the skin and loaded in tension can be used. This report describes the development of a contact adhesive based bonded rubber tension pad system for testing of an Orion P-3 wing leading edge.
DTIC
Adhesives; Aerodynamic Loads; Rubber; Structural Analysis; Lifting Bodies

19980005604 NERAC, Inc., Tolland, CT USA
Remotely Piloted Vehicles (Latest citations from the NTIS Bibliographic Database)
May 1996; In English; Page count unavailable
Report No.(s): PB96-869854; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design and operation of remotely piloted vehicles. Topics include control equipment and techniques, testing and evaluation of vehicles and vehicle components, and program descriptions. Military and research applications are considered.
NTIS
Bibliographies; Remote Control; Design Analysis; Pilotless Aircraft; Evaluation; Performance Tests; Remotely Piloted Vehicles

19980006315 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands
CESSNA Citation 2 Flight Tests: Flight Test Execution, Elementary Data Processing and Aerodynamic Model Identification
Sridhar, J. K., Technische Univ., Netherlands; Sneekes, E. M. P., Technische Univ., Netherlands; Hulshoff, S., Technische Univ., Netherlands; Mulder, J. A., Technische Univ., Netherlands; Jun. 1997; 188p; In English; Figures in this document may not be legible in microfiche; See also PB97-204697.
Report No.(s): PB97-204986; M-796; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

Within the disciplinary group of Stability and Control, there was demand for accurate flight test data of the TUD/NLR Cessna Citation II Laboratory aircraft. Flight tests were to be performed to provide flight test data which can be used to determine an accurate unsteady aerodynamic model of the aircraft (which can be sued for SIMONA), as well as to provide force and trajectory information for the validation of a Computational Fluid Dynamics (CFD) methods. The parameter identification process with flight test data can be divided in a number of steps. In this report some of the steps will be discussed, such as: Planning and execution of a flight test program, Input design, Elementary Data Processing, Parameter identification.
NTIS
Aerodynamic Characteristics; Aircraft Models; Cessna Aircraft; Computational Fluid Dynamics; Flight Tests; Parameter Identification; Unsteady Aerodynamics

06
AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

19980004815 NERAC, Inc., Tolland, CT USA
Helmet Mounted Displays: Latest citations from the NTIS Bibliographic Database
Jun. 1996; In English; Page count unavailable, Supersedes PB95-855672.
Report No.(s): PB96-871306; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and evaluation of helmet mounted displays used by aircraft pilots. Helmet mounted visually coupled systems, integrated helmet and display sighting systems, and night vision systems are discussed. References examine prototype and baseline helmets, disconnect devices in emergency environments, and high resolution and high contrast displays. Helmet systems for military operations, fire fighting, police search and rescue, and medical services are also covered.
NTIS
Helmets; Helmet Mounted Displays; Bibliographies; Display Devices; Night Vision; Aircraft Pilots

19980004894
Aircraft landing gear dynamics: Simulation and control
Krueger, W., DLR, Germany; Besselink, I.; Cowling, D.; Doan, D. B.; Kortuem, W.; Krabacher, W.; Vehicle System Dynamics; August, 1997; ISSN 0042-3114; vol. Volume 28, no. no. 2-3, pp. 119-158; In English; Dynamics, IAVSD, Aug. 25-29, 1997, Budapest, Hungary; Copyright; Avail: Issuing Activity

The landing gear is an inevitable system for the aircraft. It absorbs the energy of the landing impact and carries the aircraft weight at all ground operations, including take off, taxiing, and towing. Numerical simulation has become an invaluable tool for the assessment of landing gear dynamics as well as of aircraft/landing gear interaction. This paper gives an overview of the landing gear requirements and illustrates landing gear operational conditions, i.e., the shimmy problem, the dynamics at touch down and at ground roll. Furthermore, three software packages used in the simulation of aircraft ground dynamics are presented. A look at flight simulators and landing gear test facilities follows. Finally, the possible application of controlled landing gears is discussed.
Author (EI)
Aircraft Landing; Landing Gear; Computerized Simulation; Computer Programs; Flight Simulators; Test Facilities

07
AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft.

19980004930
Aircraft engine condition monitoring: Stochastic identification and neural networks
Arkov, V. Y., Univ. of Sheffield, UK; Patel, V. C.; Kadirkamanathan, V.; Kulikov, G. G.; Breikin, T. V.; IEE Conference Publication; 1997; ISSN 0537-9989, no. no. 440, pp. 295-299; In English; Networks, Jul. 7-9, 1997, Cambridge, UK; Copyright; Avail: Issuing Activity

The performance of complex systems such as the aircraft gas turbine engine deteriorates in time due to the degradation or failure of its components. Condition monitoring systems have been developed to provide advanced warning of impending failure of components. by correctly predicting that a component is failing it can be replaced at an appropriate time thereby saving time and money for the operator of the system. These condition monitoring systems use various approaches and techniques to evaluate system parameters and make judgements on the condition of various components. This paper focuses on the two general approaches being investigated for condition monitoring systems: static pattern analysis approach and the dynamical systems approach. Both techniques are applied to real engine data and their performance results given.
Author (EI)
Aircraft Engines; Neural Nets; Stochastic Processes; Pattern Recognition; Markov Processes; Mathematical Models

19980005611 National Aerospace Lab., Tokyo, Japan

Conceptual Study of Advanced VTOL Transport Aircraft Engine

Saito, Y., National Aerospace Lab., Japan; Endoh, M., National Aerospace Lab., Japan; Matsuda, Y., National Aerospace Lab., Japan; Sugiyama, N., National Aerospace Lab., Japan; Watanabe, M., National Aerospace Lab., Japan; Apr. 1996; 11p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-211339; NAL/TR-1290; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

A new concept for a quiet engine for high subsonic VTOL transport aircraft is studied and presented. The concept engine, which is called 'separated core turbofan engine', is effectively applied. It is composed of three core engines, two cruise fan engines, and six lift fan engines. The cruise fan engines are optimized for high-subsonic cruise.

NTIS

Aircraft Engines; Engine Design; Vertical Takeoff Aircraft; Turbofan Engines; Noise Reduction

19980005858 National Aerospace Lab., Tokyo, Japan

Separated Core Turbofan Engine

Saito, Y., National Aerospace Lab., Japan; Endoh, M., National Aerospace Lab., Japan; Matsuda, Y., National Aerospace Lab., Japan; Sugiyama, N., National Aerospace Lab., Japan; Sugahara, N., National Aerospace Lab., Japan; Apr. 1996; 10p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-211321; NAL/TR-1289; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

A new concept for a turbofan engine called the 'Separated Core Turbofan Engine' is proposed and studied under the research program of the ultrahigh bypass turbofan engine for the next generation high-subsonic transport aircraft. The concept engine consists of two subunits, a core engine and a fan engine which are separate from each other. The results of the conceptual study show that this engine has many potential advantages over the current turbofan engines in many respects, including stability of operation and flexibility of configuration, and it also has other applications such as in advanced VTOL transport aircraft.

NTIS

Transport Aircraft; Turbofan Engines; Vertical Takeoff Aircraft; Aircraft Engines; Engine Design; Engine Parts; Bypass Ratio; Aircraft Configurations

08
AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

19980004659 National Defence Research Establishment, Avdelningen foer Styrning, Material och Undervattenssensorer, Stockholm, Sweden

Fiber Optic Guided Missiles: A Preliminary Study ***Fiberoptiskt Styrda Robotar: Foerstudie***

Alva, P., National Defence Research Establishment, Sweden; Berglund, E., National Defence Research Establishment, Sweden; Carlsson, L., National Defence Research Establishment, Sweden; Laurent, C., National Defence Research Establishment, Sweden; Oct. 1996; 21p; In Swedish; See also PB91-102665.

Report No.(s): PB97-128292; FOA-R-96-00313-2.5-SE; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Fiber optic guided missiles offers a weapon system with new and unique capabilities. A system with many missiles, guided by a common computer at the launch site, can utilize the sensor data from all missiles to optimize the overall system performance of the missiles. This report summarizes the precious work on fiber optic guided missiles and the relevant AI technology needed to develop a partly autonomous missile system. The continued work in this field should be focused on a system study assessing the capabilities and limitations of fiber optic guided missiles and on further research on optimal guidance of one, or many cooperating, missiles.

NTIS

Fiber Optics; Missiles; Missile Control

19980004669 NASA Dryden Flight Research Center, Edwards, CA USA

Linearized Poststall Aerodynamic and Control Law Models of the X-31A Aircraft and Comparison with Flight Data

Stoliker, Patrick C., NASA Dryden Flight Research Center, USA; Bosworth, John T., NASA Dryden Flight Research Center, USA; Georgie, Jennifer, NASA Dryden Flight Research Center, USA; Dec. 1997; 64p; In English

Contract(s)/Grant(s): RTOP 529-30-04

Report No.(s): NASA/TM-97-206318; NAS 1.15:206318; H-2194; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The X-31A aircraft has a unique configuration that uses thrust-vector vanes and aerodynamic control effectors to provide an operating envelope to a maximum 70 deg angle of attack, an inherently nonlinear portion of the flight envelope. This report presents linearized versions of the X-31A longitudinal and lateral-directional control systems, with aerodynamic models sufficient to evaluate characteristics in the poststall envelope at 30 deg, 45 deg, and 60 deg angle of attack. The models are presented with detail sufficient to allow the reader to reproduce the linear results or perform independent control studies. Comparisons between the responses of the linear models and flight data are presented in the time and frequency domains to demonstrate the strengths and weaknesses of the ability to predict high-angle-of-attack flight dynamics using linear models. The X-31A six-degree-of-freedom simulation contains a program that calculates linear perturbation models throughout the X-31A flight envelope. The models include aerodynamics and flight control system dynamics that are used for stability, controllability, and handling qualities analysis. The models presented in this report demonstrate the ability to provide reasonable linear representations in the poststall flight regime.

Author

X-31 Aircraft; Aircraft Control; Flight Control; Longitudinal Control; Lateral Control; Directional Control; Angle of Attack; Models

09
RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands.

19980005156 University Coll., Dept. of Economics, Dublin, Ireland

Airport Services and Airport Charging Systems: A Critical Review of the EU Common Framework

Reynolds-Feighan, Aisling J., University Coll., Ireland; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR SocietyVol.2-2; Sep. 1997; vol. Volume 2, no. No. 2; 17p; In English; Also announced as 19980005155; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Airport charging practices in recent years have been based on a principal of cost-recovery rather than on the principal of cost-relatedness for facilities used and services provided. In Europe, a wide range of services and facilities are jointly provided by the publicly owned airport authorities. Several key studies have highlighted the capacity constraints currently existing at European airports and the additional constraints likely to develop as traffic growth continues at average rates of 5-6% per annum. With the liberalisation of inter-community air transport in 18 states of Europe by the end of 1997, the issues of airport capacity allocation and efficient airport capacity management are critically important in determining the development of a truly competitive airline market for passenger and freight services. In this arena, a move towards a more market based procedure is welcome for all users and for those involved in the long term planning of air transport infrastructure requirements. There is a large body of literature proposing and supporting a more market-based approach towards charging systems, arguing that it will lead to greater efficiency in airport use and in long term capacity investments. However there are many difficulties associated with operationalising such charging mechanisms, some legal, some practical and some political. In this paper, these issues are discussed in relation to the CEC Consultation Paper on Airport Charges. This set of proposals was put forward by the Commission in 1995 and is expected to be agreed by the Council of Ministers and European Parliament during 1997. The proposals contained in the Consultation Paper are critically reviewed here, particularly in relation to (1) whether the proposals will make any difference to current charging practices and rates; (2) the way in which individual European airport services and facilities are viewed as well as the view of the airport system as a whole, (3) the possible role of the private sector in the provision and funding, of components of the suite of airport services and functions. In the next section of this paper, a framework for examining the nature of airport services is presented and the general issue of competition and privatisation in airport service provision is addressed. The section concludes by summarising the economic arguments surrounding the imposition of a marginal cost pricing scheme. In section III, the CEC paper and the proposals are briefly reviewed. In section IV, problems associated with the CEC proposals are highlighted. Many of these issues came to light in the US, where a similar cost-based, non-discriminatory, charging framework has been in place for some time. The main

conclusions from this review are that the CEC proposals will be difficult to enforce because they are vague, implementation is left to the individual member states, and because they allow for a variety of approaches to charging systems which can include substantial cross-subsidisation across aeronautical and non aeronautical uses. The fact that the Commission will not have significant powers of enforcement reduce the impact which the proposals can have.
Author
Airline Operations; Airports; Operating Costs; Market Research; Policies; Regulations; Economic Analysis

19980005157 Tel-Aviv Univ., Ramat-Aviv, Tel-Aviv, Israel
Multiple Hub Network Choice in the Liberalized European Market
Berechman, Joseph, Tel-Aviv Univ., Ramat-Aviv, Israel; deWit, Jaap, Amsterdam Univ., Netherlands; The Conference Proceedings of the 1997 Air Transport Research Group (ATRG) of the WCTR Society; Sep. 1997; vol. Volume 2, no. No. 2; 13p; In English; Also announced as 19980005155; No Copyright; Avail: CASI; A03, Hardcopy; A02, Microfiche

A key question that so far has received relatively little attention in the germane literature is that of the changes at various airports as a result of the EU liberalization policies. That is, presently, most major European airports still benefit from the so-called home-carrier phenomenon where the country's publicly or semi-publicly owned carrier uses the country's main airport as its gateway hub and, consequently, the home-carrier is also the principal user of this airport (in terms of proportion of total aircraft movements, number of passengers transported, connections, slots ownership, etc.). The country's main airport has substantially benefited from these monopoly conditions of airline captivity, strongly determined by the bilateral system of international air transport regulation. Therefore, European major airports were used to operate in essentially different markets, compared to the increasingly competitive markets of their home based carriers. This partly explains relative stability of transport volumes and financial results of European major airports compared to the relatively volatile financial results of most European national airlines. However, the liberalization of European aviation is likely to change this situation. Market access is open now to all community carriers, i.e. carriers with majority ownership and effective control in the hands of EU citizens. Ticket prices are free, governments can only intervene in case of dumping or excessive pricing. A community airline can choose its seat in any of the 15 member states. Licensing procedures are harmonized between member states. In the last few months community carriers have had unrestricted route access within the EU. Most probably this development will be extended to countries inside and outside Europe. Last year the European Commission got the mandate to start negotiations with 10 other European countries. In the meantime the EC has also started negotiations with the USA on so-called soft rights. In the meantime, open skies agreements have been concluded between the USA and most of the EU member states to facilitate strategic alliances between airlines of the states involved. As a result of this on-going liberalization the model of the single 'national' carrier using the national home base as its single hub for the designated third, fourth and sixth freedom operations will stepwise disappear. Within the EU the concept of the national carrier has already been replaced by that of the community carrier. State ownership in more and more European carriers is reduced. On the longer run mergers or even bankruptcy will further undermine the "single national carrier - single national hub" model in Europe. In the meantime, strategic alliances between national carriers in Europe will already reduce the airlines' loyalty to a single airport. Profit maximization and accountability to share holders will supersede the loyalty of these newly emerging alliances, probably looking for the opportunities of a multiple hub network to adequately cover the whole European market. As a consequence, some European airports might see a substantial decline in arriving, departing and transfer traffic, thus in revenues and financial solvency, as well as in their connection to other inter-continental and intra-European destinations. At the same time, other airports might realize a significant increase in traffic as they will be sought after by the profit maximizing airlines as their major gateway hubs. Which will be the losing airports and which will be the winning ones? Can airports anticipate the actions of airlines in deregulated markets and utilize policies which will improve their relative position? If so, what should be these anticipatory policies? These questions become the more urgent, since an increasing number of major European airports will be privatized in the near future. Although increasing airport congestion in Europe will also be reflected in a growing demand pressure for airport slots, this is not a guarantee for a stable transport volume growth of individual airports. The more volatile the market is, the more vulnerable privatized airports become. Therefore, the main issue of this study is the analysis of the opportunities of major European airports to become a central hub as a result of the network choices made by the new European airlines in a completely liberalized market. In a previous study (Berechman and de Wit, 1996), we already explored the potential of Amsterdam Airport Schiphol of becoming the major West-European hub, once European aviation markets are deregulated. A major hindrance of that study was the use of a single hub-and-spoke network. For example that model could not analyze the viability of different combinations of European hubs within a multiple hub network of alternative airline alliances. In this study, we have formulated the model of a multi-hub network where two West-European airports are used for inter-continental and intra-European travel to enable a more realistic analysis of hub choice. Like the previous one also this multi-hub model is primarily used to assess the potential ability of Amsterdam

Airport Schiphol for becoming a major West-European hub. Thus, in particular, the policy tests focus on this airport in a double hub network.
Author
Air Traffic; Air Transportation; Airline Operations; Airports; Civil Aviation; Hubs; Policies; Economic Impact; Networks; Market Research

11
CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; propellants and fuels; and materials processing.

19980004098 Iowa State Univ. of Science and Technology, Dept. of Mechanical Engineering, Ames, IA USA
Modeling and Design Study Using HFC-236ea as an Alternative Refrigerant in a Centrifugal Compressor ***Final Report, Jan. 1994 - Sep. 1995***
Popovic, P., Iowa State Univ. of Science and Technology, USA; Shapiro, H. N., Iowa State Univ. of Science and Technology, USA; Apr. 1997; 176p; In English
Report No.(s): PB97-156129; EPA/600/13; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The Environmental Protection Agency (EPA) in cooperation with the Navy has been seeking a CFC-114 drop-in placement. One alternative HFC refrigerant which appears to satisfy all physical and chemical characteristics for the Navy fleet was found to be HFC-236ea refrigerant. The project represents a part of the investigation directed to evaluate this CFC-114 alternative refrigerant as a possible drop-in replacement in Navy chillers. The objective of the study was to conduct a thorough literature review regarding centrifugal compressors and the, on the basis of the information gathered, build an accurate but simple compressor model utilizing the available compressor experimental data. Further, the developed compressor model would be used to suggest eventual design adjustments to enhance compressor performance with the alternative HFC-236ea refrigerant.
NTIS
Centrifugal Compressors; Refrigerants; Mathematical Models

19980004710 NERAC, Inc., Tolland, CT USA
Aviation Fuel Additives: Latest citations from the Energy Science and Technology Database
May 1997; In English; Page count unavailable, Supersedes PB96-861505.
Report No.(s): PB97-860068; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning research, development, and applications of additives in aviation fuels. The additives consist of the following types: antioxidants, icing inhibitors, corrosion inhibitors, lubricity additives, antimisting additives, and additives for thermal and storage stability. The applications of fuel additives in preventing deposit formation and bacterial growth are also discussed.
NTIS
Bibliographies; Aircraft Fuels; Additives; Corrosion Prevention; Antioxidants; Storage Stability

19980005537
Performance of pulverized-coal flames in a simulated combined cycle unit
Abbas, T., Imperial Coll. of Science, Technology and Medicine, UK; Charoensuk, J.; Costen, P.; Lockwood, F. C.; Combustion and Flame; October, 1997; ISSN 0010-2180; vol. Volume 111, no. no. 1-2, pp. 111-123; In English; Copyright; Avail: Issuing Activity

Measurements have been taken in a pulverized coal-fired furnace to evaluate the combustion characteristics of a combined cycle unit - a coal-fired boiler coupled with a gas/oil-fired turbine. Results are presented for two aerodynamically distinct laboratory scale burners - the single annular orifice and the single central orifice (SAO and SCO) in a 0.5 MW furnace. The combined cycle is simulated through the vitiation of combustion air delivered to the burners. Under unvitiated-air conditions, both laboratory burners offer similar combustion performance in regard to particle burnout. The SAO burner, representative of wall-fired practice, exhibits much higher NO(sub x) emissions due to the almost immediate evolution of the fuel's volatiles in an oxygen-rich shear zone immediately downstream of the burner. Its counterpart (SCO burner) gives less NO(sub x) due to a manipulation of the aerodynamics, with the volatiles being liberated in the oxygen-lean internal recirculation zone. Vitiated-air conditions produced by increasing the flue-gas recirculation, altered the burner's performance. The NO(sub x) reduction in the faster mixing burner is

substantial, from 667 to 171 ppm, with some reduction seen in burnout. For the slower mixing burner, with aerodynamics more appropriate to staged combustion, low-NO(sub x) operation is observed with a reduction from 356 to 250 ppm. More importantly, the stability limits of this burner are increasingly restricted with air vitiation. A mathematical model of coal combustion was also used to predict the observed trends of flame stability and to establish a single criterion for flame stability on both the fast and slow mixing burners operating under nonvitiated, as well as vitiated-air conditions. Flame stability strongly depends on combustion aerodynamics in the burner, while, under vitiated-air conditions, the local concentration of oxygen becomes a dominant factor. For all the operating conditions simulated by the mathematical model, it was found that the appropriate criterion for defining a stable flame is that the axial temperature profile reaches its peak value (more than 900 C) within a distance of approximately 10 burner diameters. This is the condition under which volatiles are well released from the coal and burnt in the heat-confined environment to sustain a high temperature. The model overpredicts the stability limit; this indicates a limitation of the k-epsilon model for flow with a high swirl number. It is suggested that the slow mixing of fuel and oxidant associated with low-NO(sub x) burner technology in a combined cycle operation would prevent it from achieving its expected capabilities. The results of this study suggest that a burner offering less stratification of air and fuel would be more appropriate.
Author (EI)
Flame Stability; Grinding (Comminution); Coal; Combustion; Furnaces; Boilers; Aerodynamics; Mathematical Models

19980005666 Lehigh Univ., Dept. of Mechanical Engineering and Mechanics, Bethlehem, PA USA
Corrosion and Fatigue of Aluminum Alloys: Chemistry, Micro-Mechanics and Reliability ***Final Report, 1 Jul. 1993 - 31 Mar. 1997***
Wei, Robert P., Lehigh Univ., USA; May 12, 1997; 35p; In English
Contract(s)/Grant(s): F49620-93-01-0426
Report No.(s): AD-A329634; AFOSR-TR-97-0434; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Lehigh University undertook a multidisciplinary program of research to develop a basic mechanistic understanding of localized corrosion and corrosion fatigue crack nucleation and growth in aluminum alloys used in aircraft construction, and to begin to formulate mechanistically based probability models for reliability assessments based on this understanding. The objectives of the program are: (1) the development of basic understanding of the processes of localized corrosion and corrosion fatigue crack nucleation and growth in high strength aluminum alloys used in airframe construction, (2) the formulation of kinetic models for these elemental processes, and (3) the integration of these models into probabilistic models that can provide guidance in formulating methodologies for service life prediction. The effort included a study of the feasibility for incorporating the mechanistically based probability models into appropriate fatigue analysis codes (such as MODGRO). This final technical report summarizes research completed under this grant and reflects contributions from the companion program sponsored by the Aging Airplanes Program of the Federal Aviation Administration (FAA) under Grant No. 92-G-0006.
DTIC
Aluminum Alloys; Corrosion; Aircraft Structures; Fatigue (Materials); High Strength Alloys; University Program; Multidisciplinary Research; Crack Propagation; Metal Fatigue; Life (Durability); Service Life; Reliability

19980006070 NASA Langley Research Center, Hampton, VA USA
The Characteristics of Fatigue Damage in the Fuselage Riveted Lap Splice Joint
Piascik, Robert S., NASA Langley Research Center, USA; Willard, Scott A., Lockheed Engineering and Sciences Co., USA; Nov. 1997; 376p; In English
Contract(s)/Grant(s): RTOP 538-02-10-01
Report No.(s): NASA/TP-97-206257; L-17637; NAS 1.60:206257; No Copyright; Avail: CASI; A17, Hardcopy; A03, Microfiche

An extensive data base has been developed to form the physical basis for new analytical methodology to predict the onset of widespread fatigue damage in the fuselage lap splice joint. The results of detailed destructive examinations have been cataloged to describe the physical nature of MSD in the lap splice joint. ne catalog includes a detailed description, e.g., crack initiation, growth rates, size, location, and fracture morphology, of fatigue damage in the fuselage lap splice joint structure. Detailed examinations were conducted on a lap splice joint panel removed from a full scale fuselage test article after completing a 60,000 cycle pressure test. The panel contained a four bay region that exhibited visible outer skin cracks and regions of crack link-up along the upper rivet row. Destructive examinations revealed undetected fatigue damage in the outer skin, inner skin, and tear strap regions. Outer skin fatigue cracks were found to initiate by fretting damage along the faying surface. The cracks grew along the faying surface to a length equivalent to two to three skin thicknesses before penetrating the outboard surface of the outer skin. Analysis of fracture surface marker bands produced during full scale testing revealed that all upper rivet row fatigue cracks con-

tained in a dim bay region grow at similar rates; this important result suggests that fracture mechanics based methods can be used to predict the growth of outer skin fatigue cracks in lap splice structure. Results are presented showing the affects of MSD and out-of-plane pressure loads on outer skin crack link-up.
Author
Data Bases; Fatigue (Materials); Riveted Joints; Fuselages; Damage; Full Scale Tests; Lap Joints; Fracture Mechanics; Cracks

19980006269 Army Research Lab., Weapons and Materials Research Directorate, Aberdeen Proving Ground, MD USA
A Ballistic Compressor-Based Setup for the Visualization of Liquid Propellant Jet Combustion Above 100 MPa ***Final Report, Oct. 1995 - Sep. 1996***
Birk, Avi, Army Research Lab., USA; Kooker, Douglas E., Army Research Lab., USA; Sep. 1997; 44p; In English
Contract(s)/Grant(s): DA Proj. 1L1-622618-AH-37
Report No.(s): AD-A329856; ARL-TR-1490; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes the components and operation of an experimental setup for the visualization of liquid propellant (LP) jet combustion at pressures above 100 MPa. The apparatus consists of an in-line ballistic compressor and LP injector. The ballistic compressor, based on a modified 76-mm gun, provides high pressure (55 MPa) clear hot gas for the jet ignition. A piston (projectile) is fired toward a test chamber beyond the barrel's end, and its rebound is arrested in a transition section between the test chamber and the barrel. The LP jet is injected once the piston is restrained, and combustion of the jet further elevates the pressure. At a preset pressure, a disk in the piston ruptures, and the combustion gas vents sonically into the barrel. If a monopropellant is used, the jet injection combustion process then resembles liquid rocket combustion, but at very high pressures (140 MPa). This report discusses the ballistics of the compression and compares experimental results to those predicted by a numerical model of the apparatus. Experimentally, a pressure of 70 MPa was achieved upon a 12.5 volumetric compression fact or by firing a 10-kg piston into 1.04MPa argon, using a charge of 75g of small grain M1 propellant.
DTIC
Argon; Ballistics; Combustion; Compressors; Gas Jets; High Pressure; High Temperature Gases; Injectors; Liquid Rocket Propellants; Mathematical Models

12
ENGINEERING

Includes engineering (general); communications and radar; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.

19980003938 Purdue Univ., Aerospace Sciences Lab., West Lafayette, IN USA
Laminar-Turbulent Transition in High-Speed Compressible Boundary Layers with Curvature: Non-Zero Angle of Attack Experiments ***Final Report, 1 Jul. 1994 - 30 Jun. 1997***
Schneider, Steven P., Purdue Univ., USA; Collicott, Steven H., Purdue Univ., USA; Aug. 15, 1997; 7p; In English
Contract(s)/Grant(s): F49620-94-I-0067; F49620-94-I-0326; F49620-97-I-0037
Report No.(s): AD-A329733; AFOSR-TR-97-0399; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This grant supported the work of two additional graduate students in the area of high speed boundary layer transition. The non-zero angle of attack measurements were delayed, to reduce the risk of damaging the model, currently in use at zero angle of attack (AOA). Instead, a high sensitivity laser differential interferometer is being developed, for non-intrusive high bandwidth measurements of instability waves. Work towards the larger wind tunnel discussed in the proposal was also advanced, through measurements of the effect of elevated driver tube temperatures on the extent of quiet flow. Apparatus for placement of the elliptic cone at a 3-degree AOA has been designed; these measurements will commence on completion of the zero AOA measurements, late in 1997.
DTIC
Boundary Layer Transition; Angle of Attack; Supersonic Wind Tunnels; Laser Interferometry

19980004126 Dayton Univ. Research Inst., Integrated Methods Material Characterization Group, OH USA
An Advanced Test System for the Characterization of Aerospace Materials in Severe Service Environments ***Final Report, 1 Aug. 1995 - 31 Jan. 1997***
Schehl, Norman D., Dayton Univ. Research Inst., USA; Aug. 1997; 24p; In English
Contract(s)/Grant(s): F49620-95-I-0498

Report No.(s): AD-A329824; AFOSR-TR-97-0344; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A unique, advanced test system for the characterization of materials was designed and assembled. The test system is capable of simulating the mechanical, thermal, vacuum and variable atmospheric environments that high performance aerospace materials are subjected to during service. Details of the design, optimization, and performance testing of this system are described.
DTIC

Aircraft Engines; Performance Tests; Design Analysis; Nondestructive Tests

19980004140 NERAC, Inc., Tolland, CT USA

Structural Mechanics Software: Latest citations from the NTIS Bibliographic Database

Jun. 1996; In English; Page count available, Supersedes PB95-865499.
Report No.(s): PB96-871082; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the architecture and assessment of software systems for use in the study of structural mechanics. Topics include structural dynamics, finite element analysis, concurrent and parallel computation, design spaces and rules, and flexible and portable software systems. References cover automatic structural design and analytical certification of aircraft structures.
NTIS

Bibliographies; Aircraft Structures; Dynamic Structural Analysis; Finite Element Method; Structural Analysis; Structural Design; Computer Programs

19980004235

Proceedings of the 1997 IEEE International Symposium on Assembly and Task Planning, ISATP'97

Proceedings of the IEEE International Symposium on Assembly and Task Planning; 1997; 293p; In English; Planning, ISATP'97, Aug. 7-9, 1997, Marina del Ray, CA, USA; Copyright; Avail: Issuing Activity

The proceedings contains 48 papers from the 1997 IEEE International Symposium on Assembly and Task Planning (ISATP '97). Topics discussed include: motion planning; robotic manipulators; collision avoidance; precedence graphs; task planning; robot teaching; grasping/manipulation; tolerance; assembly lines; design for assembly (DFA); scheduling; microassembly; product models; sensors; sequential planning; and microrobots.
EI

Approach Control; Computerized Simulation; Assembling; Robotics; Trajectory Planning; Collision Avoidance; Computer Programming; Robots; Machine Learning

19980004708 NERAC, Inc., Tolland, CT USA

Aircraft Antennas. (Latest citations from the NTIS Bibliographic Database)

May 1997; In English; Page count unavailable. Supersedes PB96-862115.
Report No.(s): PB97-860217; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design and applications of aircraft communication, navigation, and experimental antennas. Topics include radiation pattern calculations and measurements, antenna couplings, jamming problems, conformal arrays, microstrip antennas, and phased array aircraft antennas.
NTIS

Bibliographies; Antenna Arrays; Aircraft Antennas; Phased Arrays; Microstrip Antennas; Antenna Radiation Patterns; Antenna Couplers; Aircraft Communication

19980004733 Southwest Research Inst., Mechanical and Fluids Engineering Div., San Antonio, TX USA

Compressor Diagnostics Software: Development, Test, and Evaluation ***Final Report, Dec. 1986 - Dec. 1995***

Smalley, A. J., Southwest Research Inst., USA; Dec. 1995; 450p; In English; Sponsored in part by Pipeline and Compressor Research Council.
Report No.(s): PB96-146527; SWRI-04-5062-611; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This report describes development, test, and evaluation by industrial users of a software package to assist performance analysis and fault diagnosis for reciprocating compressors. The software compares measured variation of cylinder pressure against predictions of a model, and responds to discrepancies by adjusting model parameters (including fault magnitudes) until predictions match the measurements. The result is a performance analysis including a quantitative diagnosis of inferred faults. The perfor-

mance information includes a flow, power, effective clearance, temperature rise, and various derived quantities. The software can analyze a single cylinder end or a complete multi-cylinder compressor.
NTIS
Applications Programs (Computers); Reliability Analysis; Error Analysis; Reciprocation; Compressors; Diagnosis

19980004787 NERAC, Inc., Tolland, CT USA
Infrared Cameras. (Latest citations from the INSPEC Database)
May 1997; In English; Page count unavailable. Supersedes PB96-862693.
Report No.(s): PB97-860365; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning applications of infrared cameras. Uses in telescoping, calorimetric measurements, deformation studies, thermal-wave phenomena, and temperature measurements are described. Also referenced is use to image the heating effect of radio frequency applicators. The application in accelerated environmental stress screening and reliability growth testing of the B-52 infrared camera is also considered.
NTIS
B-52 Aircraft; Bibliographies; Infrared Radiation; Radio Frequencies; Calorimeters; Temperature Effects

19980004886
EGT Cyclone: New, but familiar
Barker, Thomas; Turbomachinery International; July-August, 1997; ISSN 0149-4147; vol. 38, no. 4. pp. 14-15; In English; Copyright; Avail: Issuing Activity

European Gas Turbines' new 13.4-MW Cyclone, introduced to the world at the ASME Turbo Expo '97, has evolved from the company's familiar industrial gas turbines. It has a two-shaft unit with hot-end drive, as opposed to the single-shaft/cold-end drive Tempest, many design features are identical to those of the Tempest. Evolution from the earlier Tornado and Typhoon is also obvious. The intent is to have an engine built from mature and proven technologies, with high reliability, availability and maintainability. The Cyclone will be available for both electric power and mechanical drive, with introductory ratings as 13.40 MW and 18,000 shp. EGT engineers have calculated simple cycle efficiency at 35 + %, and cogeneration efficiency at 81 + %.
EI
Gas Turbines; Mechanical Drives; Compressors; Combustion

19980005056
Choosing servomotor brakes
Mendolia, John, API Deltran Inc., USA; Power Transmission Design; August, 1997; ISSN 0032-6070; vol. 39, no. 8, pp. 51-54; In English; Copyright; Avail: Issuing Activity

Servomotor brakes are used mainly in vertical-axis applications to statically hold the load in the absence of power. The brake is a spring-applied, power-offtype, with a static torque 50% higher than required to hold the load. These brakes are used for dynamic braking, either as an assist to the motor, usually taking over just prior to stopping, or in emergency stop situations. To select a brake for desired performance and life, the following factors must be considered: required braking mode; type of available power; type of brake; ambient temperature extremes; brake operation; maximum speed and direction of rotation; system drag or friction torque and inertia; allowable deceleration time; and cycle-to-cycle stopping tolerance.
EI
Brakes (For Arresting Motion); Servomotors; Braking; Electric Potential; Rotors; Winding

19980005362 NERAC, Inc., Tolland, CT USA
Velocity Measurement: Laser Applications (Latest citations from the US Patent Bibliographic File with Exemplary Claims)
May 1996; In English; Page count unavailable
Report No.(s): PB96-870076; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the use of lasers in the velocity measurement of fluids and solid objects. Specific devices and application methods, and noise reduction techniques in laser Doppler velocimeter systems are

discussed. Applications are described, including the measurement of air speed, blood flow, the rotation and vibration of mechanical components, and particulate matter in fluids.
NTIS
Bibliographies; Velocity Measurement; Laser Applications; Noise Reduction; Blood Flow; Vibration; Airspeed

19980005530
Development of a high-efficiency flywheel UPS using a 3-arm inverter/converter
Andoh, Itaru, Nagaoka Univ. of Technology, Japan; Moriyama, Akira; Takahashi, Isao; Ronbunshi); July 15, 1997; ISSN 0424-7760; vol. Volume 120, no. no. 1, pp. 77-84; In English; Copyright; Avail: Issuing Activity

A single-phase high-efficiency flywheel (FW) uninterruptible power supply (UPS) with a rating of 5 kW and 200 V-1 min is described. The UPS has following characteristics: (1) batteryless system, which makes it maintenance free and results in long life (about three times that of a battery UPS). (2) Simple power conversion circuit of 3 arm configuration which can realize high efficiency and small size. The new flywheel unit, rotating at 1500 rpm, is vacuumized to eliminate windage losses by means of a zirconium getter pump. The flywheel rotor is made contact-free by a pivot bearing in high-speed states so as to assure long life. Charging or discharging of the mechanical energy of the FW is achieved by simply controlling the instantaneous slip frequency of the induction machine. The power conversion circuit consists of a three-arm bridge which has a common arm of the inverter and converter bridges. All control of the UPS is realized by simple programs in a single-chip floating point DSP.
Author (EI)
Electric Power Supplies; Inverters; Rotors; Electric Control; Frequency Control; Synchronism

13
GEOSCIENCES

Includes geosciences (general); earth resources and remote sensing; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.

19980003907 Metrica, Inc., San Antonio, TX USA
The Use of Weather Information in Aeronautical Decision-Making: 2 ***Final Report***
Driskill, Walter E., Metrica, Inc., USA; Weissmuller, Johnny J., Metrica, Inc., USA; Quebe, John C., Metrica, Inc., USA; Hand, Darryl K., Metrica, Inc., USA; Hunter, David R., Federal Aviation Administration, USA; Nov. 1997; 62p; In English
Report No.(s): DOT/FAA/AM-97/23; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

An investigation was conducted of the values, or worth functions, pilots attribute to weather and terrain variables in making decisions about flight in a single-engine aircraft under visual flight rules. This study replicated earlier exploratory research (Driskill, Weissmuller, Quebe, Hand, Dittmar, and Hunter, 1997) that used data from a single geographic area. The present study obtained data from pilots in six geographic regions of the USA. The results of this study confirm the three tentative hypotheses suggested by the data from the initial study: (1) Cognitive processes that pilots utilize in making aeronautical decisions can be modeled using regression methods; (2) The values pilots associate with varying levels of ceiling, visibility, and precipitation are a function of the terrain over which the flight is made; and (3) While values differ among pilots, specific policies can be found to describe how they assign weights in making decisions about beginning or continuing a flight. Generally, pilots use a compensatory decision strategy, combining the weather variables in making judgments about flight by compensating for poor conditions in one variable with better conditions in other variables. However, under some circumstances, pilots also tend to employ a worst-factor strategy; that is, pilots appear to have personal standards for either ceiling, visibility, or precipitation, below which they become reluctant to make a flight.
Author
Pilot Support Systems; Decision Making; Aircraft Safety; Visual Flight Rules; Cognition; Judgments

19980004556 South Dakota School of Mines and Technology, Inst. of Atmospheric Sciences, Rapid City, SD USA
Effects of Subsonic Aircraft on Aerosols and Cloudiness in the Upper Troposphere and Lower Stratosphere ***Final Report, 1 Sep. 1994 - 1 Sep. 1997***
Detwiler, Andrew G., South Dakota School of Mines and Technology, USA; 1997; 6p; In English
Contract(s)/Grant(s): NAG5-2711
Report No.(s): NASA/CR-97-206342; NAS 1.26:206342; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This work was accomplished primarily by Allison G. Wozniak, a graduate research assistant who has completed the Master of Science in Meteorology program at the South Dakota School of Mines and Technology. Ms. Wozniak was guided and assisted

in her work by L. R. Johnson and the principal investigator. Invaluable guidance was supplied by Dr. James Holdeman, NASA Lewis, the manager of the Global Atmospheric Sampling Program (GASP). Dr. Gregory Nastrom, St. Cloud (Minnesota) State University, who has used the GASP data set to provide unique views of the distribution of ozone, clouds, and atmospheric waves and turbulence, in the upper troposphere/lower stratosphere region, was also extremely helpful. Finally, Dr. Terry Deshler, University of Wyoming, supplied observations from the university's upper atmospheric monitoring program for comparison to GASP data.
Derived from text
Aerosols; Subsonic Aircraft; Upper Atmosphere; Troposphere; Stratosphere; Environmental Monitoring; Air Sampling; Cloud Cover

19980004581 National Renewable Energy Lab., Golden, CO USA
Design and experimental results for the S809 airfoil
Somers, D. M., Airfoils, Inc., USA; Jan. 1997; 104p; In English
Contract(s)/Grant(s): DE-AC36-83CH-10093
Report No.(s): NREL/SR-440-6918; DE97-000206; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

A 21-percent-thick, laminar-flow airfoil, the S809, for horizontal-axis wind-turbine applications, has been designed and analyzed theoretically and verified experimentally in the low-turbulence wind tunnel of the Delft University of Technology Low Speed Laboratory, The Netherlands. The two primary objectives of restrained maximum lift, insensitive to roughness, and low profile drag have been achieved. The airfoil also exhibits a docile stall. Comparisons of the theoretical and experimental results show good agreement. Comparisons with other airfoils illustrate the restrained maximum lift coefficient as well as the lower profile-drag coefficients, thus confirming the achievement of the primary objectives.
DOE
Aerodynamic Coefficients; Aerodynamic Drag; Airfoils; Laminar Flow; Surface Roughness; Lift

19980004593 National Renewable Energy Lab., Golden, CO USA
Design and experimental results for the S805 airfoil
Somers, D. M., Airfoils, Inc., USA; Jan. 1997; 97p; In English
Contract(s)/Grant(s): DE-AC36-83CH-10093
Report No.(s): NREL/SR-440-6917; DE97-000105; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

An airfoil for horizontal-axis wind-turbine applications, the S805, has been designed and analyzed theoretically and verified experimentally in the low-turbulence wind tunnel of the Delft University of Technology Low Speed Laboratory, The Netherlands. The two primary objectives of restrained maximum lift, insensitive to roughness, and low profile drag have been achieved. The airfoil also exhibits a docile stall. Comparisons of the theoretical and experimental results show good agreement. Comparisons with other airfoils illustrate the restrained maximum lift coefficient as well as the lower profile-drag coefficients, thus confirming the achievement of the primary objectives.
DOE
Aerodynamic Coefficients; Aerodynamic Drag; Wind Turbines

19980005367 Washington Univ., Grant and Contract Services, Seattle, WA USA
Instrumentation of a New Aircraft for Atmospheric Research by the Cloud and Aerosol Research Group, University of Washington ***Final Report, 27 Mar. 1996 - 16 Mar. 1997***
Hobbs, Peter V., Washington Univ., USA; Sep. 09, 1997; 2p; In English
Contract(s)/Grant(s): N00014-95-C-0311
Report No.(s): AD-A329932; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

For over 20 years, the UW has operated one of the premier flight facilities in the world for atmospheric research. In 1995, ONR offered to help the UW modernize its facility by obtaining (through the federal excess property system) a CV-580 aircraft for use by UW and providing the UW with financial help to instrument the aircraft for research purposes. In early 1995, the aircraft was excessed by the Federal Aviation Administration and, at the request of the UW, acquired by ONR. Both ONR and the UW expected that the aircraft would be available for UW's use by early 1996. However, ONR did not grant UW permission to either instrument or use the aircraft. ONR later excessed the aircraft; General Services Administration assigned the aircraft to the State of Washington for use by the University. UW took possession of the aircraft on 16 March 1997, thus releasing ONR from responsibility for it. Under the contract, the UW: (1) planned for installation and integration of research equipment; (2) kept the CV-580

in nearly ferry-ready condition; (3) arranged for parking, tie-down, and monitoring of it in Oklahoma City; (4) participated in the transfer of the aircraft to the UW. On 25 March 1997 (after the ONR contract expired), the UW flew the aircraft to Seattle.
DTIC
Research Aircraft; Atmospheric Effects; Research and Development

14
LIFE SCIENCES

Includes life sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and space biology.

19980003891 Armstrong Lab., Neuropsychiatry Branch, Brooks AFB, TX USA
Closed Head Injury and the Military Aviator: Assessing Cognitive Dysfunction and Seizure Risk
Drew, William E., Armstrong Lab., USA; Patterson, John C., Armstrong Lab., USA; Nov. 1997; 4p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A01, Hardcopy; A03, Microfiche

Over the last several years, two concerns have become evident with respect to the aeromedical disposition of aviators following closed head injuries. The first problem is that aviators, even with mild closed head injuries, often have subtle cognitive impairment. This impairment is often not apparent on clinical examination or cursory mental health evaluation such as the Folstein Mini-Mental State Examination. The second problem is the risk of post-traumatlc seizures primarily in aviators with moderate or severe closed head injuries. Both of these conditions clearly are problematic for the flying population in terms of information processing and sudden incapacitation. As task saturation poses a problem for individuals with the highest levels of cognitive functioning and psychomotor skills, i.e., "Top Guns", any cognitive impairment, to include cognitive slowing, poses a risk for flying safety. Clearly, sudden incapacitation, such as those resulting from post-traumatic seizure are incompatible with flying safety as well. An important aspect of closed head injury in occupational and aerospace medicine is the classification. Based on this classification, a research program has been developed to further study head injury as it relates to aeromedical disposition.
Author
Aircraft Pilots; Head (Anatomy); Physiological Effects; Risk; Cognition; Crash Injuries; Damage Assessment; Seizures

19980003894 Army Aeromedical Research Lab., Aircrew Protection Div., Fort Rucker, AL USA
Head Injury Risk in US Army Rotary-Wing Mishaps: Changes Since 1980
Shannon, Samuel G., Army Aeromedical Research Lab., USA; Albano, John P., Army Aeromedical Research Lab., USA; Licina, Joseph R., Army Aeromedical Research Lab., USA; Nov. 1997; 10p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Over the past several decades, data have been collected on U.S. Army aircraft mishaps defining the environment within an aircraft during a mishap, injuries suffered by the occupants, and the cause (or causes) of the mishap, if known. An analysis of these data indicates 60% of the occupants are injured, one-third fatally, if the mishap concludes with the aircraft impacting the ground. More significantly, despite improvements in helicopter design, restraint systems, and personal protective equipment, 68% of all fatalities had at least one fatal injury to the head. After adjusting for differences in mishaps, including the aircraft series, and the occupant's station within the aircraft, the authors concluded that an occupant's injury risk in a helicopter mishap had decreased significantly between 1980-84 and 1990-94. One factor in this was a decline in the risk of head injury, which declined by 50%. Injury risks to the face and brain, critical anatomical regions of the head, also showed a significant decline. Risks of injury to the neck, torso, and upper extremities were not significantly different between the two time intervals. Although the authors could not identify causative factors with clear implications for preventive strategies, the proportion of new, crashworthy helicopters in the U.S. Army fleet have risen steadily since 1980 and a new flyer's helmet with improved impact protection, the SPH-4B, was fielded by the U.S. Army in the 1990's.
Author
Aircraft Accidents; Risk; Crashes; Helicopters; Crash Injuries

19980003900 BTS Consulting Engineers, Windsor, Ontario Canada
Addressing Front Row HIC Requirements in Commercial Airplanes
McCarthy, J. R., BTS Consulting Engineers, Canada; Yang, K. H., Wayne State Univ., USA; Shanahan, M. T., BTS Consulting Engineers, Canada; King, A. I., Wayne State Univ., USA; Nov. 1997; 6p; In English; Also announced as 19980003879; Copyright Waived; Avail: CASI; A02, Hardcopy; A03, Microfiche

Changes to the Federal Aviation Administration (FAA) regulation regarding occupant crash protection in commercial airplanes has created new design considerations for each occupant position. In particular, addressing front row seating positions to

meet the head injury criteria can be a challenging design assignment involving numerous considerations. Various design approaches to meet this requirement are discussed. Particular attention is given to the articulating seat pan approach. Results of prototype testing are presented with recommendations regarding further development.
Author
Commercial Aircraft; Head (Anatomy); Protection; Impact Resistance; Seats; Dynamic Tests

15
MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

19980003934 Technische Univ., Delft, Netherlands
Simulation Host Software Requirements Document
vanGool, P. C. A., Technische Univ., Netherlands; Jan. 1996; 32p; In English
Report No.(s): PB97-206098; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The document describes the requirements placed upon the simulator host computer as far as the simulation software is concerned. In the SIMONA Research Simulator Software Requirements Document, the simulator host computer is described as the device which executes the simulation software and controls the connection and communication to the simulation subsystems. The document will mainly focus on the computer's function as simulation host and not on its function as fileserver. In the document, a more elaborate and precise description of entity and environment requirements will be given.
NTIS
Flight Simulators; Distributed Interactive Simulation

19980004906 General Accounting Office, Washington, DC USA
Testimony Before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives. National Airspace System: Observations on the Wide Area Augmentation System
Oct. 1997; 22p; In English
Report No.(s): AD-A330131; GAO/T-RCED-98-12; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In the 1980s, FAA began considering how a satellite based navigation system could eventually replace the ground based system that had long provided navigation guidance to aviation. In August 1995, after years of study and research, FAA contracted with Wilcox Electric to develop WAAS. However, because of concerns about the contractor's performance, FAA terminated the contract in April 1996. In May 1996, the agency entered into an interim contract with Hughes Aircraft. The interim contract with Hughes was subsequently expanded and became final in October 1996. Under the terms of the WAAS development contract, Hughes will deliver an initial operational capability (Phase 1 WAAS) to FAA by April 1, 1999. The original date written into the Wilcox contract was December 1997. Phase 1 WAAS will be able to support the navigation of aircraft throughout the continental USA for all phases of flight through Category I precision approaches. However, the Phase 1 system will not have sufficient redundancy to continue operations in the event of equipment failures and will have to be backed up by FAA'S current ground based system. FAA expects to conclude the operational testing of Phase 1 WAAS in June 1999 and to commission the system by July 15, 1999. to make WAAS capable of serving as a sole means navigation system throughout the USA, FAA plans to expand the system in Pha ses 2 and 3 of the contract. The Phase 3, or full, WAAS is scheduled to be delivered by October 2001 and commissioned in early 2002.
DTIC
Congressional Reports; Hughes Aircraft; National Airspace System; Navigation; Satellite Navigation Systems

19980004973
Recovering deterministic behavior from experimental time series in mixing reactor
Letellier, C., LESP/UMR CNRS, France; Le Sceller, L.; Gouesbet, G.; Lusseyran, F.; Kemoun, A.; Izrar, B.; AIChE Journal; September, 1997; ISSN 0001-1541; vol. Volume 43, no. no. 9, pp. 2194-2202; In English; Copyright; Avail: Issuing Activity

The velocity field in a standard mixing reactor with a Rushton impeller is analyzed by using techniques from the theory of nonlinear dynamical systems. It is shown that the dynamical behavior contains a quasi-periodic motion with three frequencies, f(sub p), the frequency associated with the rotation of blades, f(sub p)/6, and a third frequency f'. Relying on an evaluation of the correlation dimension equal to 3.9, the phase space is likely to be at least four-dimensional. Moreover, a set of four ordinary differ-

ential equations is indeed automatically obtained by using a global vector field reconstruction technique, confirming the existence of a 4-D-deterministic behavior contributing to the dynamics of the system.
Author (EI)
Time Series Analysis; Nonlinear Systems; Resonant Frequencies; Rotation; Rotors

19980005137 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA
Rethinking Strategic Brigade Airdrop
Beaubien, Seth, Air Force Inst. of Tech., USA; Apr. 1997; 72p; In English
Report No.(s): AD-A330287; AFIT/GMO/LAC/97Y-1; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Strategic Brigade A irdrop has been an American force employment method for over fifty years. This paper looks at SBA's viability, now and in the future. A history of SBA analyzes the tragedies and triumphs of SBA over the years. Specifically noted are common threads through history that continue to effect SBA today. Problems within SBA as varied as doctrine, safety, equipment, personnel and acquisition politics signal the need for change. Three alternatives are provided to the present plan to airdrop a brigade size force from C-1 41, C-5 and C-17 aircraft. The first alternative is a response to changing warfighting doctrine and the political realities of battlefield casualties. It involves the shifting from an airdrop to an airland method of troop deployment. The second alternative offers a less expensive aircraft for the personnel portion of the airdrop mission. It provides more mass on the DZ in less time. The last alternative uses a brand new aircraft to deploy troops in a swarm of aircraft landing like helicopters on the DZ. Multiple corridors and many aircraft are used to increase flexibility while decreasing vulnerability over the DZ. This paper rethinks SBA from an 'outside the box' perspective. Its intention is to show weaknesses and vulnerabilities of the present SBA plan, at the same time offering thoughtful solutions to the problem of deploying Army troops from the fort to the DZ.
DTIC
Air Drop Operations; Aircraft Landing; Deployment; Flying Personnel; Helicopters; Personnel; Safety

19980005339 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands
Frequency Domain Identification of Multivariable State Space Models. Analysis Procedures and User's Guide
Sridhar, J. K., Technische Univ., Netherlands; Soijer, M., Technische Univ., Netherlands; Breeman, J. H., Technische Univ., Netherlands; Mulder, J. A., Technische Univ., Netherlands; Dec. 1996; 240p; In English
Report No.(s): PB97-191787; MEMO-727; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The main object of this study is the development and improvement of multiple input/multiple output algorithms for system identification in the frequency domain and the application to rotorcraft flight-data. In addition, these algorithms are to be implemented in personal computer based software, using MATLAB 4.2 for Windows. to validate the algorithms and the software, an eighth order rigid body model for fully coupled rigid body dynamics of the BO-105 is identified and compared to the results obtained by the members of AGARD working group 18.
NTIS
Algorithms; Rotary Wing Aircraft; BO-105 Helicopter; Computer Programs; System Identification

16
PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.

19980003991 NERAC, Inc., Tolland, CT USA
Noise Control for Aircraft. (Latest citations from the INSPEC Database)
Nov. 1996; In English; Page count unavailable. Supersedes PB96-857636.
Report No.(s): PB97-851877; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the techniques for studying and predicting aircraft noise. Topics include noise control techniques, including landing trajectories, noise impact, and other sources of noise pollution. Community response to aircraft noise is considered.
NTIS
Bibliographies; Aircraft Noise; Noise Reduction

19980004154 Army Aviation Systems Command, Joint Research Program Office, Hampton, VA USA
Full-Potential Modeling of Blade-Vortex Interactions
Jones, Henry E., Army Aviation Systems Command, USA; Dec. 1997; 92p; In English
Contract(s)/Grant(s): RTOP 505-63-36-03; DA Proj. A-5226
Report No.(s): NASA-TP-3651; L-17594; NAS 1.60:3651; ATCOM-TR-97-A-005; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

A study of the full-potential modeling of a blade-vortex interaction was made. A primary goal of this study was to investigate the effectiveness of the various methods of modeling the vortex. The model problem restricts the interaction to that of an infinite wing with an infinite line vortex moving parallel to its leading edge. This problem provides a convenient testing ground for the various methods of modeling the vortex while retaining the essential physics of the full three-dimensional interaction. A full-potential algorithm specifically tailored to solve the blade-vortex interaction (BVI) was developed to solve this problem. The basic algorithm was modified to include the effect of a vortex passing near the airfoil. Four different methods of modeling the vortex were used: (1) the angle-of-attack method, (2) the lifting-surface method, (3) the branch-cut method, and (4) the split-potential method. A side-by-side comparison of the four models was conducted. These comparisons included comparing generated velocity fields, a subcritical interaction, and a critical interaction. The subcritical and critical interactions are compared with experimentally generated results. The split-potential model was used to make a survey of some of the more critical parameters which affect the BVI.
Author
Blade-Vortex Interaction; Unsteady Flow; Transonic Flow; Models; Aerodynamics; Computational Grids; Rotary Wings

19980006073 NASA Lewis Research Center, Cleveland, OH USA
Comparison of the Aeroacoustics of Two Small-Scale Supersonic Inlets ***Final Report***
Ng, Wing, NASA Lewis Research Center, USA; Sep. 1996; 135p; In English
Contract(s)/Grant(s): NAG3-1539
Report No.(s): NASA/CR-96-206507; NAS 1.26:206507; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

An aerodynamic and acoustic investigation was performed on two small-scale supersonic inlets to determine which inlet would be more suitable for a High Speed Civil Transport (HSCT) aircraft during approach and takeoff flight conditions. The comparison was made between an axisymmetric supersonic P inlet and a bifurcated two-dimensional supersonic inlet. The 1/14 scale model supersonic inlets were used in conjunction with a 4.1 in (10.4 cm) turbofan engine simulator. A bellmouth was utilized on each inlet to eliminate lip separation commonly associated with airplane engine inlets that are tested under static conditions. Steady state measurements of the aerodynamic flowfield and acoustic farfield were made in order to evaluate the aeroacoustic performance of the inlets. The aerodynamic results show the total pressure recovery of the two inlets to be nearly identical, 99% at the approach condition and 98% at the takeoff condition. At the approach fan speed (60% design speed), there was no appreciable difference in the acoustic performance of either inlet over the entire 0 deg to 110 deg farfield measurement sector. The inlet flow field results at the takeoff fan speed (88% design speed), show the average inlet throat Mach number for the P inlet (Mach 0.52) to be approximately 2 times that of the 2D inlet (Mach 0.26). The difference in the throat Mach number is a result of the smaller throughflow area of the P inlet. This reduced area resulted in a 'soft choking' of the P inlet which lowered the tone and overall sound pressure levels of the simulator in the forward sector by an average of 9 dB and 3 dB, respectively, when compared to the 2D inlet.
Author
Aeroacoustics; Supersonic Inlets; Engine Inlets; Aircraft Engines; Flow Distribution; Flow Measurement; Mach Number; Inlet Flow

17
SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law, political science, and space policy; and urban technology and transportation.

19980004503 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA
Comparison of Effects of Change from 8 to 12 Hour Shifts on Air Force Aircraft Maintenance Workers
Overland, Daniel W., Air Force Inst. of Tech., USA; Sep. 1997; 55p; In English
Report No.(s): AD-A329844; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This study examined the effects of converting from an 8 hour shift system to a 12 hour system on aircraft maintenance personnel. The squadron had converted its 24 hour operations from an 8 hour shift schedule to a 12 hour shift schedule in stages, changing one group first and then another. A smaller third group of workers remained on 8 hour shifts. Individual differences in job related outcomes and situational constraints were measured for all three groups. Results showed that changing from 8 to 12 hour shifts affected worker well being and morale, as indicated by an increase in hospital visits after the switch to 12 hour shifts and the difference in levels of morale between 12 hour shift personnel and those remaining on 8 hour shifts.
DTIC
Aircraft Maintenance; Schedules; Ground Crews

18
SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radation.

19980004137 NERAC, Inc., Tolland, CT USA
Hubble Space Telescope: Latest citations from the Ei Compendex*Plus Database
Feb. 1996; In English; Page count unavailable.
Report No.(s): PB96-861174; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the Hubble Space Telescope and its mission. Topics include design changes, flight performance, and initial problems encountered. The Hubble's solar arrays and observations of space are discussed.
NTIS
Bibliographies; Hubble Space Telescope; Solar Arrays; Flight Characteristics

19980004147 Aerospace Corp., Space and Environment Technology Center, Los Angeles, CA USA
Global Ultraviolet Imager (GUVI) Investigation ***Final Report, 8 Nov. 1993 - 7 Dec. 1994***
Christensen, Andrew B., Aerospace Corp., USA; Jan. 1995; 106p; In English
Contract(s)/Grant(s): NAS5-32572
Report No.(s): NASA/CR-97-203904; NAS 1.26:203904; Rept-1480-4944; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This report summarizes the work performed under contract NAS5-32572. It is divided into six sections. Section 1 is an overview of the GUVI program; section 2 is the technical description; section 3 discusses the flight software; section 4 is the science parameter extraction; section 5 is the instrument DPU; and section 6 is the calibration and characterization.
Author
Ultraviolet Imagery; Computer Programs; Applications Programs (Computers); Flight Control

Subject Term Index

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

V

W

X

Personal Author Index

S

T

V

W

Y

Z

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